THE IRON TRADE REVIEW

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THE WEEK IN IRON CIRCLES.

THE MARKET AT LARGE.

Next to the continued heavy demand—greater than ever known in December—the feature of the situatior is the effort of strong interests to keep prices within bounds. Not only is this seen in the virtual decision to maintain this year's basis on old-range Lake Superior ores, as noted in this column two weeks ago, though no meeting of the ore interests will be held until early in January, but in the announced attitude of the United States Steel Corporation in favor of the maintenance of prices on ore, Bessemer pig iron, structural material and rails. While it is true the steel corpora tion is a buyer of Bessemer iron it could easily afford to pay 50 cents a ton additional for the small amount of this metal it buys, for the effect the establishment of the higher base would have upon finished material prices, if it were disposed to advance the latter. Thus far the United States Steel Corporation and the merchant furnacemen producing Bessemer iron have acted as a unit in holding the price at $15.25 at furnace; but at the same time furnacemen are getting 50 and 75 cents a ton more from outside buyers who have spoker more quickly than the big corporation for January and February iron. Moreover furnaces not in the association are asking the leading interest $15.75 at furnace for iron, the indications being that this price will be paid if the corporation secures sufficient outside iron for its January and February requirements. There has been some discussion of a proposal to advance the rail price to $30, but as with structural material, the steel corporation is reported to be opposed to such a step. The chief matter of comment throughout the trade is the amount of the business going on sellers' books in the closing month of the year. The attitude of buyers has been changed by the developments of the past two months. While heavy contracting has been going on since early October, not until recently has there appeared any evidence that buyers were otherwise than complacent on the matter of deliveries in the first half of 1902. In two lines, foundry iron and structural material, there are signs of forward buying, not to cover business taken by the buyers, but to make sure of a supply of material when needed. Chicago reports work under negotiation in that city that will require 20,000 tons of structural shapes; and in all the large cities there is work on the architects' boards that is expected to reach the structural mills in the next three months. The plate mills are getting more business, the Central West furnishing a further quota for lake vessel work. Another plate mill is under way at Conshohocken, Pa., which will add to the competition in Eastern Pennsylvania. Bars are comparatively quiet, but the mills are all fully employed on contracts. The steel situation is no better, from the standpoint of the buyer of billets. Further imports may be expected, as the Central Western mills of the leading producers are reported sold to July 1 and the Chicago district mills into May. At Pittsburg prompt billets bring $27.50 to $28. Considerable activity is reported in rods at Pittsburg, sales of 12,000 tons being noted at $32 and $32.50, while $33 is now asked. The foundry iron situation is particularly strong, and while producers protest that they want to hold prices down an early advance of 50 cents in Southern is expected. Freight rates from Southern furnaces to points north of the Ohio river are likely to be advanced at the opening of the year, but no official announcement is made as yet. The reduction of pig iron stocks in November, coupled with an increase in active producing capacity, is an evidence of remarkable activity, in spite of the serious hamperings of insufficient car and locomotive supply. At Pittsburg 100,000 tons of finished material is piled up at the mills because the railroads cannot move it. It is reported that 10,000 tons of German hematite iron has been imported for Eastern works.

PITTSBURG.

OFFICE OF *The Iron Trade Review*,
429 PARK BUILDING, Dec. 18

From information received from the largest iron and steel manufacturers in this district, we can state that nearly 100,000 tons of finished iron and steel products are stocked at their mills awaiting shipment. This is the greatest accumulation of material since the freight congestion began to hamper shipments from this district, and as the railroads are by no means giving the manufacturers their needed quota of cars the stocks are increasing daily instead of decreasing as the manufacturers hoped would be the case after the coal shipments to the lake ports ceased and the switchmen's strike was over. The strike was declared off last week, but shipments thus far are no better than they have been and the manufacturers have come to the conclusion that the track and yard facilities of the railroads entering this district are not nearly sufficient to handle the great tonnage of freight which should be shipped from this territory daily. Promises have been made by the railroads from time to time, but as yet the great steel producers have secured no relief.

The shipment of coke to the furnaces not only in this district, but in the Mahoning and Shenango Valleys is improving and furnaces are enabled to operate more steadily than for some time. While a number are still banked, several others that have been out of operation for some time on account of the non-shipment of coke went into operation again during the past few days. The production of Bessemer iron has been greatly curtailed, owing to the frequent interruptions at the furnaces, and all the merchant furnaces are behind on deliveries. As a result the United States Steel Corporation has been able to secure only 25,000 tons of Bessemer iron for January delivery and the furnacemen cannot promise more than a like amount for February delivery. The steel corporation is in the market for additional Bessemer for January delivery but the furnaces outside of the Bessemer Association refuse to sell at $15.25 at the furnace and are asking an advance of 50 cents per ton, which the steel corporation refuses to pay. The outside furnacemen declare that they can dispose of their product at this price and point to sales of 7,000 tons during the past week for January and February delivery to prove their ascertions. As the furnaces of the steel corporation have also been hampered in operation owing to the scarcity of coke and have not produced their full quota of material it is altogether

probable that the price asked will be paid in order to secure the material.

As noted in our last issue the Alice furnace of Pickands, Mather & Co., at Sharpsville, Pa., has been purchased by the Youngstown Iron Sheet & Tube Co., of Youngstown, O. This again lessens the number of merchant furnaces in the valleys which have been steadily diminishing since the formation of combinations in the iron and steel trade.

Despite the fact that the year is drawing to a close, the amount of new business that is being placed is entirely satisfactory to the manufacturers. In structural material the tonnage booked will keep the mills in full operation until April, while the outlook in plates is growing brighter. The steel bar market shows no signs of weakening, and the wire and wire nail trade, despite reduced prices is in a healthy condition, nearly all the mills operating in full. That the independent manufacturers anticipate an excellent demand during the next three months is indicated by the tonnage placed in rods during the week estimated at 12,000 tons. Most of this was placed at $32 and small lots at $32.50. This buying movement has stimulated the rod market, however, and prices have again been advanced to $33 per ton.

While no meeting of the steel rail manufacturers has yet been called, it is reported that some of the allied interests are asking for a meeting to be held in January for the purpose of slightly advancing prices. Some are in favor of an advance to $30 per ton, but it is stated on excellent authority that the United States Steel Corporation is opposed to any advance for the reason that it may delay the early placing of contracts by railroads next fall should the price be retained for delivery in 1903.

PIG IRON.—Three furnaces in the Valleys that have been either out or banked were started again last week. One of the furnaces of the Republic Iron & Steel Co. at Youngstown, O., after being banked a month on account of the shortage of coke was put in operation, while the furnace of the Sharon Steel Co., at South Sharon, Pa., was relighted. The Struthers furnace at Youngstown, O., was also blown in, having received a new lining. The Bessemer iron situation, so far as the merchant furnaces are concerned, is causing some annoyance to the United States Steel Corporation. The furnaces of the Bessemer Association cannot deliver more than 20,000 or 25,000 tons of Bessemer to the corporation in February, although fully twice this amount will probably be required. The association has fixed a price of $15.25 at the furnace to the corporation, but this will not be met by the outside furnaces which are asking $15.75 for their iron at the furnace and as they are now holding the only available iron outside of what the Association furnaces produce it is probable that this price will have to be paid. We note the sale of 7,000 tons of Bessemer iron for January and February delivery at $15.75 at the furnace. Sales of 4,000 tons of No. 2 foundry iron are reported at prices ranging from $15.75 to $16 per ton. Forge iron is held at $15 to $15.25 per ton. We make the following quotations:

Bessemer, Valley	$15 25 to 16 00
Bessemer, Pittsburg	16 00 to 16 75
No. 1 Foundry	16 00 to 16 50
No. 2 Foundry	15 75 to 16 00
No. 3 Foundry	15 25 to 15 50
Gray Forge, Pittsburg	15 00 to 15 75
Chilled Basic, Valley	15 00 to 15 25
Chilled Basic, Pittsburg	15 75 to 16 00

STEEL.—The wire rod market has been extremely active during the past week, sales of 12,000 tons having been made for delivery during the first quarter of next year at $32 and $32.50 per ton, Pittsburg. Manufacturers are now holding rods at $33 per ton. While some of the manufacturers of steel billets claim that for delivery the first half of next year they will take orders for Bessemer billets at $25 per ton, we have not yet been advised that any contracts have been closed at this price. For prompt delivery both Bessemer and open-hearth billets continue to rule high, the former at $27.50 to $28 per ton and the latter at $29 per ton.

FERRO-MANGANESE.—Domestic ferro-manganese is held at $52.50 per ton in carload lots delivered at buyer's mill, while foreign, 80 per cent is quoted at $50 per ton.

SPELTER.—The spelter market continues to rule strong and prices are firmly maintained at 4.25c to 4.30c, for prime Western grades, Pittsburg.

MUCK BAR.—Sales of muck bar in small lots have been made during the week at $29.50 to $29.75 per ton.

SKELP.—We note the sale of 2,000 tons of steel skelp at 1.70c per ton. Iron skelp is quoted at 1.75c to 1.80c per ton, both grooved and sheared.

RAILS AND TRACK MATERIAL.—At the present time the rail manufacturers are carrying orders for rails for next year's delivery on their books amounting to nearly 1,800,000 tons. Owing to the booking of this enormous tonnage some of the manufacturers are in favor of advancing the price $2 per ton and there has been talk of a meeting in January for this purpose. However the leading interest does not favor an advance and it is altogether probable that rail prices will be continued throughout the next year as established at present. We make the following quotations: Standard sections, 50 pounds and over, in lots of 200 tons and over, $28; car lots and less than 200 tons, $30; less than car lots, $32; light rails, 8 pounds, $42; 12 pounds, $38; 16 pounds, $35; 20 pounds, $34; 25 to 40 pounds, $32. Track material: Spikes, 1.95c to 2c; track bolts, square heads, 2.40c; hexagon heads, 2.55c; fish plates, 1.50c to 1.60c.

PLATES.—The plate situation is gradually growing stronger and it is believed by the manufacturers that after the first of the year a brisk demand will set in. Another plate manufacturer will be in the field within the next year, the Alan Wood Iron & Steel Co., Conshohocken, Pa., having decided to erect a universal mill. An open-hearth steel plant of five furnaces with a capacity of 50 tons each will also be erected by this concern. This will increase the competition in plates in the Eastern portion of Pennsylvania, which is already very keen. We make the following quotations: Tank plate, ¼-inch thick and up to 100 inches in width, 1.60c at mill, Pittsburg; flange and boiler steel, 1.70c; marine, ordinary firebox, A. B. M. A. specifications, 1.80c; still bottom steel, 1.80c; locomotive firebox, not less than 2.10c; and it ranges in price to 3c. Plates more than 100 inches wide, 5 cents extra 100 pounds. Plates 3-16 of an inch in thickness, $2 extra; gauges Nos. 7 and 8, $3 extra; No. 9, $5 extra. These quotations are based on carload lots, with 5 cents extra a hundred pounds for less than carload lots. Terms, net cash in 30 days.

BARS.—While the amount of new business in iron and steel bars is not large, the manufacturers are all well satisfied with the condition of the market, owing to the big tonnage they are now carrying on their books. We make the following quotations: Common iron bars, 1.50c, Pittsburg, for Western delivery and 1.55c, Pittsburg, for Eastern delivery; refined iron bars, 1.75c and upwards; Bessemer steel bars, 1.50c; open-hearth, 1.60c; plow beams and cultivator beams, 1.50c, net; channels, angles, zees and tees, Bessemer under three inches, 1.60c; over 3 inches, 1.70c. Hoops and bands are quoted at 1.90c, full extras.

PIPES AND TUBES.—Reports received from jobbers in merchant pipe in all parts of the country are to the effect that their stocks are all extremely low and that they will stock up immediately after the first of the year. All the jobbers have let their stocks run down and will not replenish until after inventories have been made. The export trade in merchant pipe is falling off considerably, the foreign business of the National Tube Co. during the month of November not reaching quite 2,000 tons. Quotations made below are being shaded by independent manufacturers anxious to secure business. Discounts to consumers, in carload lots, Pittsburg, are as follows:

MERCHANT PIPE.

	Blk. Per cent.	Galvd. Per cent.
⅛ to ⅜ and 11 to 12 inches	61	48
½ to 10 inches	68½	56

BOILER TUBES.

Steel.

	Per cent.
1 to 1¼ inches	47½
2¼ to 5 inches	65½
1¾ to 2¼ and 6 to 13 inches	60

Iron.

	Per cent.
1 to 1½ and 2½ inches	43½
1¾ to 2¼ inches	43
2¾ to 13 inches	53

CASING.

	S. and S. Per cent.
2 to 3 inches	58
3¼ to 4 inches	63
4¼ to 12½ inches	65

SHEETS.—This week another manufacturer of sheets has entered the market. The Parkersburg Iron & Steel Co., Parkersburg, W. Va., placed four of its mills in operation and the remainder will be started shortly. Follansbee Bros. of this city, large jobbers in sheets, have decided to erect a sheet mill and are now looking for a desirable site in this district. Deliveries on the heavier gauges are still from 10 weeks to three months behind. The Maryland Sheet & Steel Co., of Cumberland, Md., will commence the rolling of sheets 10 to 18 gauge shortly after the first of the year and the output of the heavier gauges will thus be materially increased. Black sheets in large lots to consumers are held as follows: Nos. 10 and 12, 2.40c to 2.50c; 14 and 15, 2.50c to 2.60c; 16, 2.60c; 18 and 20, 2.70c to 2.80c; 22 and 24, 2.80c to 2.90c; 26, 2.90c to 3c; 27, 3c to 3.10c; 28, 3.10c to 3.20c; 29, 3.25c to 3.35c; 30, 3.35c to 3.45c. Galvanized sheets are quoted at 70 and 5 off in carload lots; less than carload lots, 70 off.

STRUCTURAL MATERIAL.—The demand continues strong and we have been advised that the structural mills are filled up with business until April 1. Our quotations are as follows: Beams and channels, 3 to 15 inches, 1.60c; 18 to 24 inches, 1.70c; tees, 1.65c; zees, 1.60c; angles, from 3 to 6 inches, 1.60c; universal mill plates, 1.60c.

WIRE AND WIRE NAILS.—Foreign shipments of wire and wire nails during November by the American Steel & Wire Co., amounted to about 4,500 tons. The cutting of prices on wire nails continues and on all moderate sized lots $2 per ton is being quoted by large independent interests. We make the following quotations: Single carloads of wire nails to jobbers at $2 to $2.10 and less than carloads at $2.15 to $2.20; plain wire, carload lots, is quoted at $2.15 to $2.20 to jobbers and $2.25 to $2.30 to retailers; painted barb wire, $2.60 in carload lots to jobbers, and $2.70 to retailers; galvanized barb wire, $2.85 to $2.90 in carload lots to jobbers, and $3 to retailers. Cut nails are quoted at $2.05, Pittsburg, in carload lots, and $2.10 to $2.15 in less than carload lots, 2 per cent off in 10 days.

MERCHANT STEEL.—The outlook in merchant steel for next year is excellent and all the large producers report a large tonnage already closed. We quote as follows: Turned, cold rolled and ground shafting 60 and 62½ per cent off for car lots and 55 to 57½ per cent off for less than car lots; tire steel in carload lots and over, 1.60c; less than carload lots, 1.75c to 1.80c. Toe calk is sold at 1.70c, in large lots, and in small lots as high as 1.85c. Tool steel is held at 7c and upwards, according to quality.

OLD MATERIAL.—Demand for old material is reported good, but owing to the steadiness of the market in other lines, old material is not fluctuating to any great extent. We make the following quotations, gross tons: Heavy melting stock, $16.75 to $17.25; low phosphorus melting stock, $18 to $18.50; steel rails, $17 to $17.25; busheling scrap, $13 to $14; No. 1 wrought, $17 to $17.25; iron rails, $21 to $22; cast borings, $8.25 to $8.50; cast scrap, $14 to $14.25.

COKE.—The coke market continues firm and Connellsville furnace coke for delivery the first half of next year is held at $2.15 per ton. Connellsville foundry coke is held at $2.50 per ton. Outside furnace coke is held at $1.90 and foundry at $2.15 to $2.25 per ton. Production in the Connellsville region continues at the rate of about 236,000 tons per week, but if the shipments were properly made by the railroad companies the production would be immediately run up to 250,000 tons weekly.

CHICAGO.

OFFICE OF *The Iron Trade Review*,
534 MONADNOCK BLOCK, Dec. 17.

Nothing has developed to change the local situation. The close of lake navigation last week as a result of the cold snap has not yet made itself felt in the deflection of cars, and the universal demand is far more rolling stock. All large producers are suffering greatly from the present situation, and as a result some mills are refusing to take orders that call for delivery before March, requiring this length of time to catch up on shipments that have been delayed. Consumers are suffering in like degree, and many industries and enterprises dependent on their supply of iron and steel for their continued operation, are facing the disagreeable alternative of paying almost prohibitive prices for material or shutting down. Unless some relaxation of the stringency is felt in the near future, it is difficult to forecast what the damage will amount to. The volume of business continues in as great proportions as heretofore, the demand for prompt shipment being especially heavy. All Southern furnaces have withdrawn present quotations, pending an advance of 50 cents a ton, which it is expected will be announced this week. A rumor has also been current of late that railroads north of the Ohio River will announce an advance of 20 cents a ton on the freight rate of Southern iron Jan. 1, though this will not be definitely known until the meeting of the Central Traffic Association this week in this city. Plates have been in greater request during the past week, several thousand tons having been booked by Eastern mills. The local mill has about four weeks' work on hand. In the structural line the prospects are exceptionally good, new buildings at present being figured on and contemplated requiring about 20,000 tons of material.

PIG IRON.—Iron for prompt shipment is in great demand, due to the scarcity of cars which has materially delayed shipments. All Southern furnaces have withdrawn present quotations, and an advance of 50 cents a ton on all grades will be made this week. Several large inquiries are in the market, varying from 5,000 to 1,000 tons, some of which, it is expected, will be closed within a few days. Northern furnaces continue to refuse new business for delivery within the next four months, as they report it will take them at least this length of time to catch up on orders that have been delayed as a result of the fuel shortage. Some Southern furnaces are in an almost parallel predicament, accumulating stock for want of cars to ship it out. Transactions during the past week have been limited mostly to small lots, though the aggregate tonnage is good. The freight rate on Southern irons, it is reported, will be advanced 20 cents a ton Jan. 1 by railroads north of the Ohio River, though this is not officially confirmed. We quote prices as follows:

Lake Sup Charcoal	$18 50 to $19 20	Southern Coke No. 4	$14 15 to $14 40
Local Coke Fdy. No. 1	16 00	Southern No. 1 Soft	15 65 to 15 90
Local Coke Fdy. No. 2	15 50	Southern No. 2 Soft	15 15 to 15 40
Local Coke Fdy. No. 3	15 00	Southern Gray Forge	14 15 to 14 40
Local Scotch Fdy. No. 1	16 00	Southern Silveries	15 90 to 16 40
Local Scotch Fdy No. 2	15 50	Jackson Co. Silveries	17 00 to 17 50
Local Scotch Fdy No. 3	14 50 to 15 00	Ohio Strong Softeners	17 00 to 17 50
Southern Coke No. 1	15 65 to 15 90	Alabama Car Wheel	20 50 to 21 00
Southern Coke No. 2	15 15 to 15 40	Malleable Bessemer	16 50 to 17 10
Southern Coke No. 3	14 65 to 14 90	Coke Bessemer	18 00 to 18 50

BARS.—There is a plentiful supply of business in small orders being offered, and all mills are comfortably filled. A large inquiry for needs in the early part of next year is developing itself, and indications point to a heavy buying movement after the holidays. On good business, prices are slightly shaded from present quotations by mills outside of the pool. We quote iron and steel bars, 1.65c to 1.75c Chicago; out of store, 1.90c to 2c.

SHEETS.—There is an excellent demand, which the supply from mills is totally inadequate to meet. Shipments made into this territory still apply on contracts made prior to the strike. Deliveries have still further been delayed by the scarcity of cars and the strike of Pittsburg switchmen. Jobbers report an excellent business. We quote No. 27 black, out of store, 3.40c to 3.60c, and galvanized, 70 per cent to 70 and 5 per cent.

BILLETS.—Owing to the inability of mills to supply the trade, local consumers have been compelled to purchase imported billets. Transactions are limited entirely to small lots, and these are invariably sold as a favor. We quote Bessemer billets, $31 to $32, and open-hearth, $33 to $34.

STRUCTURAL STEEL.—There is an excellent demand for all classes of structural material, and mills are some months behind in deliveries. Buildings being figured on and contemplated in this city will require about 20,000 tons of structural shapes. The scarcity of cars has been keenly felt by structural mills, work on many buildings in this territory having been considerably delayed for want of material. We quote mill shipments, carload lots, as follows: Beams, 15 inches and under, 1.75c; 18 inches and over, 1.85c; angles, 6x6 and under, 1.75c, over 6x6, 1.85c; plates, 1.75c base; tees, 1.80c; zees, 1.75c; small lots from store, ½c to ¾c higher; beams and channels from store, ½c to ¾c per pound higher.

RAILS AND TRACK SUPPLIES.—Large orders for standard rails from steam and electric railroads are offered almost daily, but owing to the inability of mills to guarantee the delivery desired, many of the deals have fallen through. Several thousand tons of light rails were booked by the local mills during the past week, with an accompanying heavy inquiry. Track supplies are in good demand, though the local mills can take nothing for delivery within the next three or four months. We quote as follows: Standard rails, $28; light sections, $34 to $36, according to size; out of store, $40 to $44; splice bars, 1.70c to 1.80c; spikes, 1.95c to 2.05c; track bolts, and hexagon nuts, 2.80c to 2.90c, out of store, 2.90c to 3c; square nuts, base, $2.65 to 2.75c; out of store, 2.75c to 2.85c.

MERCHANT STEEL.—New business is constantly being offered, but mills can take only a small proportion of it, as a result of the large tonnage already on their books and the heavy specifications coming in against old contracts. We quote mill shipments, Chicago delivery, as follows: Smooth finished tire steel, 1.85c to 2c; open-hearth spring steel, 2.25c to 2.50c; toe calk, 2.40c to 2.60c; sleigh shoe, 1.65c to 1.80c; cutter shoes, 2.40c to 2.60c; ordinary tool steel, 6c to 7c; specials, 13c and upwards; less than carload lots, 5 per cent to 10 per cent higher.

PLATES.—Quite an improvement is noticeable in the demand for this material, several thousand tons having been booked by Eastern mills during the past week. The local mill has about four weeks' work on hand, with several large contracts pending. Our quotations follow: Tank steel, base, ¼-inch, 1.75c to 1.85c; flange steel, 1.90c to 2c; marine steel, 1.95c to 2.10c; firebox steel, ordinary, 2c to 2.10c; special, 2.25c and upwards. Jobbers are selling from store, according to size, as follows: Tank steel, 1.90c to 2c; flange steel, 2c to 2.25c; marine steel, 1.95c to 2.10c; firebox steel, ordinary, 2c to 2.25c; special, 2.50c and upwards.

CAST IRON PIPE.—With the exception of small orders, the recent cold weather has driven all new business out of the market. Heavy buying does not commence until the spring. We quote as follows: 4-inch water pipe, $29; carload lots, f. o. b. Chicago; 6-inch water pipe, $28; 8-inch and larger sizes, $27; gas pipe, $1 per ton higher than above prices.

MERCHANT PIPE.—A few sales are reported, but with the suspension of building operations as a result of the cold weather, these will grow less. We quote

MERCHANT PIPE, RANDOM LENGTHS.

	Black Per cent.	Galv. Per cent.
⅛ to ⅜ and 11 to 12 in.	59.5	46.5
½ to 10 inches	67	54.5

BOILER TUBES.

	Steel Per cent.	Iron Per Cent.
1 to 1½ in.	40	35
1¾ to 2½ in.	45	40
2¾ to 5 in.	55	50
6 in. and larger	45	40

WIRE AND NAILS.—There is no diminution in the heavy demand for all kinds of wire products from Western and Southwestern States. Jobbers in this territory have little or no stock on hand, the mild weather which has prevailed in this section of the country until within the last few days, resulting in practically all the material shipped from mills going into immediate consumption. The strike of switchmen at Pittsburg and the scarcity of cars in other parts of the country greatly reduced shipments. Though the local manufacturer has announced no reduction in the price of nails, quotations are being shaded, and nails are now selling on the basis of $2.25 in small lots to the retail trade; painted barb wire, $2.70 to $2.80, and galvanized wire, $3 to $3.10. It is not expected that prices will go any lower, but that after the first of the year they will in all probability advance.

COKE.—With the closing of lake navigation, local sellers are looking forward to heavier receipts of coke. There is no change in the situation from that reported for several weeks. We quote Connellsville coke $5 to $5.25, though $5.50 and $6 are paid for prompt shipment.

OLD MATERIAL.—Buying has been light during the past week, as a result of the low offers by mills. Since the formation of the Western bar iron manufacturers into a pool, it is reported that those in the organization have agreed on a scale of prices which they will pay for scrap, and as fast as contracts with dealers expire are endeavoring to enforce this scale. Dealers in the main refuse to sell at the prices offered. We quote as follows, gross tons:

Old iron rails	$21 00 to $21 50	Relaying rails	26 00 to 27 00
Old steel rails, 5 ft. and up	19 00 to 19 50	Old wheels	$16 00 to $16 50
Old steel rails, mixed	13 50 to 14 50	Heavy melting steel	13 50 to 14 25
		Mixed country steel	10 50 to 11 00

The following are selling prices per net ton:

No. 1 R. R. wrought	$15 00 to $15 50	Iron axles	$30 00 to $31 50
No. 2 R. R. wrought	13 25 to 13 75	Cast borings	4 75 to 5 25
Dealers' forge	13 00 to 13 50	Wrought turnings	10 00 to 10 50
No. 1 busheling	11 00 to 11 50	Iron axle turnings	12 00 to 12 50
No. 1 R.R. & mach. cst.	11 50 to 12 25	Steel axle turnings	10 50 to 11 50
Railway malleable	12 00 to 12 50	Stove plates	8 50 to 9 00
Country malleable	11 50 to 12 00	Old iron splice bars	16 50 to 17 00

CLEVELAND

OFFICE OF *The Iron Trade Review*,
1064 ROSE BUILDING, Dec. 18.

There has been no meeting of the executive committee of the old range producers of Bessemer ores, and non will be held until early in January—probably between the 5th and the 10th. At that time the figures for the past year will be gone over together with the mining companies' estimates of their ability to produce in the coming year. However, as previously stated in these columns, the base price for 1901 will without doubt be continued for 1902, the United States Steel Corporation having taken a stand in favor of the old price after conference with other ore interests. So much business in finished material has been done for 1902 that there is no reason longer to delay sales of Bessemer ores. In non-Bessemers considerable business has already been done, substantially at the figures of last season. The ore business is to so large an extent continuous now, through the existence of term contracts, that the opening of a new season's sales has not the significance it once had. The prices on which these term contracts are based, added to the influence of the United States Steel Corporation, will prevent the fluctuations heretofore known from season to season.

All the considerable producers of steel are now represented on the Mesabi range as mine owners or have 10-year contracts for Mesabi ore. Some have both. The Lackawanna Iron & Steel Co. is known to have provided for much of its ore for a period of years, the contracts including both Mesabi and old range ores. The arrangement of the Youngstown Iron Sheet & Tube Co. was referred to in these columns last week.

PIG IRON.—There has been no heavy buying of foundry iron in this market the past week, but there are indications that some consumers, even though they receive their full quota on contracts in the next two months, will not have enough iron for their wants. Some Valley furnacemen are asking $15 for No. 2 foundry for delivery in the first half of 1902, while others have put up prices 50 cents in the past 10 days, and are quoting $15.50, equivalent to $16.25 delivered Cleveland. The latter price is obtained without difficulty for prompt delivery, but it is next to impossible to pick up any iron for immediate needs. Forge iron is firmer and $14.50 Valley furnace is asked for the little Northern that is to be had. Southern forge is delivered at Valley mill at $14.25. For Bessemer iron $16 Valley furnace, equivalent to $16.75 Cleveland, has been offered, delivery in December, but such iron is not to be had. For January and February delivery it is understood that sales have been made at $15.75 Valley furnace, or 50 cents higher than the United States Steel Corporation has paid. We quote the Cleveland market as follows:

Bessemer	$16 00 to $16 75	Scotch No. 1	$16 25 to $16 75
No. 1 Strong F'dry	16 25 to 16 75	Scotch No. 2	15 75 to 16 25
No. 2 Strong F'dry	15 75 to 16 25	Gray forge, Valley	14 50
No. 3 Foundry	15 25 to 15 50	LakeSuperior charc'l	18 00 to 18 50

FINISHED MATERIAL.—There has been a good local business in structural steel in the past week 7,000 to 8,000 tons being closed—some of it for vessel work, but the greater part for structural works. The local building outlook is considered good for the coming season, but the work has not come to the stage of buying steel as yet. One vessel contract has brought upwards of 2,500 tons of steel to the mills this week in addition to the five vessels referred to last week. We continue to quote 1.70c Cleveland on tank plates and on beams and channels. The bar trade is quiet, but heavy deliveries are being made on contract. We quote 1.58½c Cleveland for both iron and steel, carload lots, mill shipments; on bars

from store, 1.75c to 1.85c. While on some gauges the sheet mills are now able to make better deliveries, on others they are still from two to three months behind, notably 14, 16 and 18 gauges. For mill shipments in carload lots to consumers we quote f. o. b. cars Cleveland: No. 24, 2.90c to 3c; No. 26, 3c to 3.10c; No. 27, 3.10c to 3.20c, with the usual extras for less than carload lots, etc. The demand from store continues large and some gauges go out as fast as received. We quote in round lots from store: No. 10, 2.35c to 2.50c; No. 12, 2.45c to 2.60c; No. 14, 2.55c to 2.70c; No. 16, 2.95c to 3.10c; No. 18, 3c to 3.15c; No. 20, 3.05c to 3.20c; Nos. 22-24, 3.15c to 3.30c; Nos. 25-26, 3.25c to 3.40c; No. 27, 3.35c to 3.50c; No. 28, 3.45c to 3.60c. The above are for one pass cold rolled. For full cold rolled the extra is .10c. Galvanized sheets are in good demand at from 70 to 70 and 5 off list.

OLD MATERIAL.—The local prices for scrap continue firm and good sales are being made at the figures quoted in these columns a week ago. The season for the usual mill inventory does not seem to have any noticeable effect on buyers generally and dealers are well satisfied with present conditions, while prospects for further business are very encouraging. Quotations, all in gross tons, are as follows:

Old steel rails, rolling mill lengths	$17 00 to 18 00
Old steel rails, short lengths	15 75 to 16 50
Iron rails	21 00 to 22 00
No. 1. railroad wrought	16 50 to 17 50
Mill scrap	14 50 to 15 00
No. 1. machine scrap	13 75 to 14 00
Cast borings	6 50 to 7 00
Grate bars	9 00
Sheet iron	9 00 to 10 00
Stove plate	10 00 to 10 50
Car wheels	15 50

CINCINNATI.

Dec. 17

There is little interruption to the general trend of business by the approaching holiday season. In every branch of the iron trade there is continued good demand and a constant appeal for as early delivery as can be promised. In all lines the buyers are as willing to contract for delivery months ahead as if they were buying for delivery at once, confidence in the continuation of present conditions and willingness to trust to the future being thus clearly shown.

The more highly worked out the product is, the longer the time before delivery can be made. Thus, pig iron can be secured, although in very small quantities, on what passes for immediate delivery to bridge over a break. Castings are procurable on longer deliveries. The product of the rolling mills are to be had on even longer deliveries. Machine tools cannot be promised under several months. Engines take longer, while electrical machinery of certain types cannot be had under a couple of years out of some shops.

There is still complaint about getting coke. The impossibility of getting cars makes the delivery of pig iron a matter of weeks, where it ought to be days. The delay in getting castings is attributable to the slowness of the pig iron men in making deliveries to the foundry. As the car shortage is responsible for this condition, the delay in getting castings to the machine tool builder can be traced indirectly to the same cause. If the machine tool builder, however, could get caught up with his orders he would not find any such trouble as car shortage to interfere with his sleep.

The belief that present conditions are to remain for some time is found in the fact that there is much more building and far more increases and additions to old factories as well as the inception of new ones than there has been. Many factories are compelled to make additions. Others consider it an advantageous time to make increases that have been contemplated for some time.

PIG IRON.—The pig iron market is firm, without showing any advances during the past week, though some large handlers profess to believe that a further advance may be looked for. The demand is urgent. Many melters are trying to secure deliveries on existing contracts; others are seeking to get some small supplies not contracted for but wanted immediately. Still others are contracting for their wants through next year. Up to within the past fortnight orders have been for iron for delivery during the first half of 1902. Since Dec. 1 there have been some orders placed for iron for delivery during the last half of the coming year, while during the past week some large contracts have been placed on which deliveries extend clear through the year. One contract was for 7,500 tons, including both Southern and Northern foundry grades and other grades as well. Another was for 7,000 tons and a third for 6,000, all of these calling for deliveries through the year 1902. Some large buyers have had the idea that the market was being sustained on something more than mere demand and supply. One large interest sent out a letter to furnaces asking for quotations on a good amount of iron. The concern was not able to do any better than it could do by the agents through whom it had been buying, even though in more than one case inquiry was directed to furnaces from which it was receiving iron on contracts made through the agents. The result, as the pig iron men see it, was that the furnaces were only strengthened in their position.

The inquiry for immediate or early delivery has been largely for No. 4 and gray forge. There is not much relief in the way of earlier deliveries on any of the Southern grades. The coke situation is not being afforded much relief either. One important interest has been compelled to pay 50 cents a ton premium for early delivery of coke to its furnace and charge the cost up to the coke producer, who had the contract to supply coke to the furnace. Following are quotations f. o. b. Cincinnati:

Southern Fdy. No. 1	$14 50 to $14 75	Gray Forge	$13 00 to $13 25
" " 2	14 00 to 14 25	Northern Fdy. No. 1	16 75 to 17 00
" " 3	13 50 to 13 75	" " 2	16 25 to 16 50
" " 4	13 00 to 13 25	Southern C.W. iron	18 25 to 18 75
So. Fdy. No. 1 soft	14 50 to 14 75	Malleable coke iron	16 10 to 16 35
So. Fdy. No. 2 soft	14 00 to 14 25		

FINISHED MATERIAL.—The demand for finished material is steady and the market remains firm. Supplies in the hands of iron stores are being replenished piecemeal and are being drawn on freely. Mills are behind in about the same proportion as heretofore and deliveries are not by any means satisfactory to the buyer who wants goods quick. Manufacturers are now buying for January delivery in bar iron and are contracting for their needs months farther in the new year. Prices show no change but some mill men and handlers are talking of an advance. Iron bars are 1.62c carload lots; steel bars are the same; angles, 2c; plates, 1.85 to 1.90c; sheets, No. 28, 3.35c to 3.40c; No. 12 blue annealed, 2.35c.

OLD MATERIAL.—The scrap market remains quiet but firm. A few kinds are in demand but there have been no large lots of any sort picked up as far as reported. Following are quotations:

Old No.1 Wrought Railroad, net tons	$ 15 00 to 15 25
Cast Machine and Foundry, net tons	12 50 to 12 75
Old Iron Rails, gross tons	20 25 to 20 75
Old Steel Rails, gross tons	15 50 to 16 50
Old Short Lengths, gross tons	14 00 to 14 25
Old Iron Axles, gross tons	21 00 to 21 50
Old Iron Car Wheels, gross tons	16 00 to 16 25
Stove Plates, gross tons	9 75 to 10 00
Wrought Turnings, net tons	11 50 to 11 75
Cast Borings, net tons	5 50 to 6 00

The plate production of Eastern Pennsylvania is to be further increased. The Alan Wood Iron & Steel Co., Conshohocken, Pa., has decided to install a combination universal plate and blooming mill, the output of which will be about 500 tons per day. The contract for the engines to operate this mill has already been let to the Mesta Machine Co., of Pittsburg. In addition an open-hearth plant to consist of five 50-ton open-hearth furnaces will also be erected. Julian Kennedy of Pittsburg is designing and constructing engineer.

The Riter-Conley Mfg. Co., of Pittsburg, has in hand a contract for the largest water tower in the world. It is to be erected at East Providence, R. I., and will have a capacity of one million gallons, which is estimated to be an ample storage supply for a town of 15,000 people. The details of construction have not been definitely settled, but it is stated that the total height of the structure will be 370 feet above mean high water mark. The tank is to be 50 feet in diameter, and 70 feet high.

An eight-hour crew at the Ohio plant of the National Steel Co., Youngstown, O., last week produced 581 ingots in 145 heats, making 1,450 tons of steel during this shift. It is claimed that this is the best steel producing record ever made in a Bessemer converting mill.

THE IRON TRADE REVIEW

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DECEMBER 19, 1901.

PRICE POLICY OF THE STEEL CORPORATION.

The statement in these columns two weeks ago, that it had been practically decided that the $4.25 base for old-range Lake Superior Bessemer ores remain unchanged in 1902, has been followed by an announcement of the position of the United States Steel Corporation. Officers of the steel corporation believe that the interests of the iron trade will be conserved by the continuance of the present basis, though pig iron and all finished products have advanced since the $4.25 basis was established. That the attitude of this great interest is made known thus early, before details of the ore business of 1901 have been made up or schedules for next year's production discussed, or any formal meeting of the ore interests held, indicates a belief that the situation demands at this time the exercise of a strong steadying influence. The intention seems to have been to make the ore price felt as a factor in shaping the policy of the iron trade for 1902 rather than to have the events of the early months of 1902 give color to the decision concerning ore.

As a matter of fact, much has been determined about the iron trade for 1902, while the 1901 output of Lake Superior ores has been coming down. Leaving out the steel rail purchases, which, with the reservations made for railroads not yet ready to name their requirements, substantially take up the estimated capacity of the mills for 1902, it is fair to assume that 90 per cent of the capacity for foundry and forge pig iron for the first quarter and 75 per cent of the same capacity for the second quarter has been sold. Consumers of ores, therefore, particularly non-Bessemer ores, have already done considerable business in which 1902 ores will enter.

The significant fact about the announcement concerning ores by the United States Steel Corporation is not the power which it implies, though this is noteworthy, since the steel corporation has none of the ores to sell for which it has practically made the price; but rather the proof it gives of the sobering effect of great power upon broad-minded men. The same week gave another illustration of the attitude of the steel corporation in the decision of the structural steel manufacturers to make no advance in prices. There were those who favored an advance. Whatever odium might have come from it would have centered not upon them, but upon the overshadowing interest which popular opinion holds responsible for all that goes awry in the steel trade. It is understood that the steel corporation representatives were strenuous against any advance, and the proposition was dropped.

It is evident that the United States Steel Corporation purposes to suppress, so far as it can, any tendency to repeat the spectacular performances of 1899. As it is, the producer can know substantially 16 months ahead what his ore will cost. The foundation is thus laid for a stable market, which as it avoids the dangerous up-swings of the pendulum, will also be exempt from the disastrous dips below cost line, which are still an unpleasant memory of the summer of 1900. How the United States Steel Corporation will act under declining demand is yet to be demonstrated. That the export safety valve will be opened under such a condition while the situation at home will be saved from serious decline or disturbance, seems a reasonable expectation. If this corporation aims to supply the largest possible percentage of the world's wants in iron and steel products, the problem of price becomes at once of paramount importance. To undertake to give direction to prices calls for a degree of wisdom and insight that has not yet appeared in corporate management; but it would seem that wisdom has been learned from the example of the German iron and fuel syndicates, and it is to be hoped the lesson will long be kept fresh.

We do not look for any such sharing with the public in the economies of concentrated management of the iron industry, as some glowing promises have held out. But it is evident that the country is to be saved from the wide swings of the pendulum that have been so marked in the history of the iron trade thus far, and from the dislocations to business that have always resulted. The receiverships and losses that have come because of these prince-and-pauper movements in iron are beyond calculation. Labor has suffered untold hardships from the alternations of booms and depressions. Whatever the United States Steel Corporation may do to save the iron trade from both should count strongly in its favor. If it shall maintain prices that fairly average the crests and troughs of the waves of former years, it will have justified its existence. The resultant gain to the public will far outweigh any price reduction that might come from the broadcast distribution of all the "economies of concentrated management."

THE BONUS PLAN AS A CURE FOR SHOP FRICTION.

The paper presented by Mr. Gantt, at the New York meeting of the American Society of Mechanical Engineers, made a profound impression upon the members—an impression that will extend as the paper, which was published in *The Iron Trade Review* last week, is the more widely circulated. The system described has its limitations, but these have certainly not stood in the way of a remarkable measure of success where the method has been introduced under expert supervision

and it is only fair to withhold general comparisons with other projects of a like purpose until the Gantt system has had an opportunity to exhibit its possibilities under more exacting conditions.

The interest in this carefully devised system of shop management, as well as in the older and less experimental "premium plan," springs from the opportunities it offers for the creation of a new sentiment in the shop. The growth of a better feeling between the employer and the employe has been deemed a chimera, a vain hope in which philanthropic dreamers might indulge, but to be scouted as a visionary and impractica ble ideal by the matter-of-fact workman and the management. It could not well be otherwise from the instinctive belief that the two interests are antagonistic—a belief carefully fostered by those to whom industrial friction is the means of a livelihood.

In how many shops, for example, is the foreman looked upon as the representative at its worst, of a soulless and grasping corporation? That the foreman is expected to be keenly alive to the best interests of his employer is beyond any dispute whatever, but it is not just to credit him with enmity on that score toward his fellow employer. This, however, is the light which plays upon his motives in many establishments, irrespective of the very natural possibility that his end in life is in reality identical with that of his subordinates.

If there is any place where community of interest may be the essential difference between success and failure it is in the humanity of the average shop. Granted the healthy stimulus of a united purpose, a mutual dependence, and a better appreciation is apt to follow. The incentive to this profitable condition may be obtained either by the "bonus" or the "premium plan"; but any lever to effectually lift the workman to that plane where he will do justice to the good intentions of the officials of his company; where the foreman may take hold and freely advise with the employe without injury to mutual good feeling, and where each is fully convinced that the profit to the manufacturer increases directly with the additions to the salaries paid—this is truly an innovation of an epoch-making type.

Any influence that breaks down the grip of a paralyzing routine is to be welcomed. Precedent has a place and purpose in all fields of industrial usefulness but it may act as a brake rather than a spur when present achievement is limited to the standard set by past endeavors. It is the hope of a greater reward that beckons the worker to the point where he will gladly receive instruction, and where he will also urge to more strenuous efforts the tardy among his fellow workmen who may inadvertently or purposely impede his own progress.

Aside from the moral effect there is another direction in which the new order is likely to work a revolution should it be generally adopted. It will cause many of the tools now in use to be more quickly thrown into the scrap heap. The pace will be a furious one where all are striving for the maximum rate of production. The new machine design will establish a higher duty to meet the vigor of these later conditions and the tool steel must stand a more destructive test. The old-time conversation among the men waiting a turn at the slow-moving grindstone will be but a memory in the modern shop. Loss of time will mean a direct drain upon the financial returns in general, and the best interests of the employer will be safeguarded as a matter of course by the workman who, under this system, shares the profits.

LAKE ERIE ORE RECEIPTS 17,014,076 TONS.

Shipments of iron ore by water from the Lake Superior region in the season of 1900 amounted to 20,157,522 gross tons. Reports just received from Lake Erie dock managers show that of the total shipments there was sent to Lake Erie ports 17,014,076 gross tons. This figure establishes a new record, the total for 1900 having been 15,797,787 gross tons. We give below our annual tables showing shipments by ports, also the receipts at each Lake Erie port and the amount on dock at the close of navigation. As for the two preceding years Two Harbors has the largest total of shipments. Escanaba resumes the second place which it lost to Duluth last year. Duluth shows a considerable falling off.

	1901.	1900.	1899.	1898.
Escanaba,	4,022,668	3,436,734	3,720,218	2,803,513
Marquette,	2,354,284	2,661 861	2,733,596	2,245,965
Ashland,	2,886,252	2,631,687	2,703,447	2,391,088
Two Harbors,	5,018,197	4,007.294	3,973,733	2,693,245
Gladstone,	117,089	418,854	381,457	335,956
Superior,	2,321,077	1,522,899	878,942	550,403
Duluth,	3.437.955	3,888.986	3,509,965	2,635,262
Total, by lake,	20,157,522	18,570,315	17,901,358	13,655,432
Total, all rail,	. . . .	489.078	350,446	369,241
Total shipments,		19,059,393	18,251,804	14,024,673

To arrive at the total shipments from the Lake Superior region, Michipicoten, the new shipping port on the north shore of Lake Superior should be included. It sent out 230,000 tons the past season. This added in gives a total of 20,387,522 tons. Of the Michipicoten Bay shipments, which were all of ore from the Helen mine, 160,941 tons went to Lake Erie ports, 57,305 tons to Hamilton, Ont., and the balance to Midland, Ont.

The totals of our tables showing receipts at Lake Erie ports and stocks on dock are as follows:

Receipts at Lake Erie ports in 1901.....17,014,076 tons
On docks at Lake Erie ports, Dec. 1, 1901..... 5,859,663 tons

Our statistics of last May showed 3,050,183 gross tons on Lake Erie docks at the opening of navigation this year. Adding to this the receipts of the season just closed and subtracting the amount on dock Dec. 1 shows that the shipments to furnaces since May 1 (including ore unloaded directly upon furnace docks) were 14,204,596 gross tons, as against 11,613,773 tons in the corresponding period of 1900 and 11,765,158 tons in 1899. The table below gives the receipts of ore at Lake Erie ports in 1901 and the five years preceding:

IRON ORE RECEIPTS AT LAKE ERIE PORTS, GROSS TONS.

Ports.	1901.	1900.	1899.	1898.	1897.	1896.
Toledo.....	798,298	645,147	792,348	414,012	416,438	301 794
Sandusky.....	33,017	154,542	87,499	136,200	79,792	58 667
Huron	431,311	321,914	263,600	126,755	198 231	226,515
Lorain.....	721,662	1,090 235	1,112,946	536,086	355,188	191,445
Cleveland.....	3,831,060	3,376,644	3,222,582	2,645,318	2,456,704	2,313,170
Fairport.....	1,181,776	1,085,554	1.241,013	912,879	1,008,340	941,446
Ashtabula.....	3,981,170	3.709,486	3,341,526	2,684,563	3,001,914	2,272,822
Conneaut.....	3,181,019	2,556,631	2,320,696	1,404.169	495.327	327,623
Erie.....	1,379.377	1,240,715	1,309,961	1,092,364	1,311,526	847,849
Buffalo.. ..... } Tonawanda }	1,475,365	1,616,919	1,530,016	1,075,975	797,446	545,101
Total.....	17,014,076	15,797.787	15,222,187	11,028,321	10,120,906	8,026,432

Conneaut has made a good stride as a receiving port in the past year. Ashtabula, as heretofore, leads Cleveland, but by less than in 1900. The following table gives the amount of ore on dock Dec. 1:

IRON ORE ON LAKE ERIE DOCKS, DEC. 1, GROSS TONS.

Ports.	1901.	1900.	1899.	1898.	1897.	1896.
Toledo.....	254,196	242,373	186,422	146,568	194,644	115,959
Sandusky.....	47,384	95,111	23,184	48,500	84,786	59,491
Huron	231,501	211,377	164,480	139,982	230.029	200,075
Lorain.....	195,863	251,838	337,822	324,034	317,509	231,288
Cleveland.....	1,378,060	1,317,445	1,200,806	1,175,970	1,478,355	1,419,311
Fairport.....	710,590	611,717	692,147	719,794	825,312	773,905
Ashtabula.....	1,769.145	1,811 459	1,902,598	1,732,671	1,835,694	1,441,666
Conneaut	604,106	630,514	468,808	288,101	360,895	275,800
Erie.....	470 718	480,734	361,335	439.167	434,871	355,222
Buffalo.....	198,100	232,100	192,681	131,620	111,660	82,267
Total.....	5,859 663	5,904,670	5 530,283	5,136,407	5,973,755	4,954,984

TWO 350-TON FURNACES FOR SHARON STEEL CO.

(Special Telegram.)

PITTSBURG, Dec. 18.—At a meeting of the board of directors of the Sharon Steel Co., held at Sharon, Pa., last Saturday it was decided to increase the pig iron production by the erection of two additional furnaces with a capacity of 350 tons each per day. The work of erecting the furnaces will be pushed as speedily as possible and with their completion the daily output of iron will amount to 1,200 tons. The decision of the directors to erect 350-ton instead of 600-ton furnaces is an interesting departure from the trend of blast furnace practice in recent years. At a meeting of the board the question whether it would be better to erect one 700-ton furnace than two smaller furnaces was debated for some time, but it was finally decided that it would be advisable to erect two smaller furnaces, in view of the fact that fine Mesabi ores are to be worked. Furnace men operating large furnaces and using a large percentage of fine ores have learned from experience that the daily output of iron is much smaller than the furnace can make on lumpy ores and with smaller stacks. By giving the sides of the furnace a greater slant it is believed that the frequent explosions, as the results of hangs, can be entirely overcome. The Sharon Steel Co. has started on an interesting departure in blast furnace construction since the coming in of the fine ores, and it is altogether probable that stacks to be erected in the future will be constructed on similar lines. The new furnaces are designed for basic practice. It is reported that the erection of a plate mill was discussed but the directors refuse to affirm or deny the report.

The skelp mill of the company will be placed in operation about April 1 and the tube mill in June. Twelve sheet mills now under course of construction will be placed in operation next May. The capital of the Sharon Coke Co., one of the subsidiary companies of the Sharon Steel Co., has been increased to $2,500,000.

A BLAST FURNACE RECORD OF 806 TONS.

(Special Telegram.)

PITTSBURG, Dec. 18.—On Tuesday, Dec. 10, No. 2 stack of the Ohio plant of the National Steel Co., Youngstown, O., working on Bessemer ores, produced 806 tons of iron. This is the greatest record ever made by any blast furnace in the world. Several weeks ago one of the new furnaces of the Carrie plant of the Carnegie Steel Co. at Rankin, Pa., operating on Bessemer ores produced 790 tons of iron in 24 hours. This was a phenomenal record and at the time it was believed that it would be long before it would be eclipsed or even equaled. The stack of the National Steel Co. is 105 feet high and was completed during the past year. The iron from this furnace is converted into steel at the Ohio mill.

The Isabella Furnace plant of the American Steel Hoop Co., in this city, is undergoing extensive repairs. The ore bins are being rebuilt and the stock yard is being remodeled and extended. Many labor saving devices are being put on the furnace.

The annual banquet of the officials of the Carnegie Steel Co. will be held on Thursday evening, Dec. 19, at the Hotel Schenley. President Charles M. Schwab, of the United States Steel Corporation, will attend, but it is not probable that Andrew Carnegie will be present, although it was believed until a few days ago that he would be the honored guest.

American Engineers to Design British Blast Furnaces.

It is of interest to note that the following blast furnace construction has been undertaken in Great Britain: Guest, Keen & Co., Ltd., Arthur Keen, chairman, will reconstruct their Cardiff plants. The Bolckow-Vaughn Co., Ltd., David Evans general manager, will construct two new plants and the Consett Iron Co., Ltd., George Ainsworth general works manager, will build four new plants. Frank C. Roberts & Co., engineers of Philadelphia, have been commissioned to design and supervise the construction of these works.

PHILADELPHIA MARKETS.

Dec. 17.

What the future holds in store none can predict, but the cold facts of today are that the railways do not have rolling stock enough to take care of the traffic which is offered them; the blast furnaces find it difficult to operate at their full capacity on account of a shortage of coke; the mills find their base of supplies inadequate to meet their demands; manufacturers in general are unable to satisfy their customers in regard to time of deliveries—in short it seems as if all lines of industry are shy of material, and in some cases, men to lick it into shape. Much difference of opinion exists as to the trend of prices, some holding that an advance is inevitable, while others contend that from a business standpoint it would not be a good policy to take advantage of what may prove to be only a temporary scarcity. The records for November show a general falling off in the output of furnaces, due principally to lack of fuel, the tonnage thus lost being very heavy.

PIG IRON.—Practically everything is sold up so closely that there is no iron offered for early delivery. Although the market has a very quiet appearance yet prices are hardening, and those who have neglected to cover their requirements are being held up for from 25 to 50 cents per ton. At these figures buyers are generally chary of contracting for more than their immediate wants, although realizing the possibility of having to face further increases later. As near as can be ascertained prices for Philadelphia and nearby points range about as follows: No. 1 X foundry, $16.25 to $16.50; No. 2 X foundry, $15.75 to $16.25; No. 2 plain, $15.35 to $15.65; standard gray forge, $14.50 to $14.75; ordinary gray forge, $13.75 to $14; basic (chilled), $14.50 to $14.75; Bessemer, $15.75 to $16.

FINISHED MATERIAL.—There is no let-up in demand, and considering the season, the activeness displayed is remarkable. The plate mills have secured quite a bit of business lately, favoring their continued operation to their full capacity. The scarcity of structural material is, if anything, more acute, and prompt deliveries command a premium of from two to five dollars per ton. The demand for sheets is active and makers are considerably behind in their deliveries. A possibility exists of higher prices for bars. Taking it altogether the market is firm with prices mantained at about the following figures for seaboard and short distance deliveries: Plates, ¼-inch and thicker, 1.75c to 1.80c; bars, iron or steel, 1.62½c to 1.70c; angles, 1.75c to 1.85c; beams and channels, 1.75c to 1.85c.

OLD MATERIAL.—With light supplies and good demand prices are firm and the indications point to higher quotations in the near future. Bids and offers for deliveries in buyers' yards are about as follows: Choice railroad scrap, $20.50 to $21; ordinary light scrap, $12.50 to $12.75; machinery cast, $14 to $14.50; heavy steel scrap, $17.75 to $18; old iron rails, $21 to $21.50; old steel rails, short lengths, $17.75 to $18.25; wrought turnings, $13 to $13.25; cast borings, $8 to $8.50; old car wheels, $16.50 to $17; old iron axles, $24 to $25; old steel axles, $19.50 to $20.50.

Parkersburg Iron & Steel Co.

(Special Telegram.)

PITTSBURG, Dec. 18.—The Parkersburg Iron & Steel Co., with offices in the Times building, will place in operation four hot mills, four cold mills, and two breaking-down mills at its new plant, Parkersburg, W. Va., tomorrow. The sheet plant when completed will contain six hot mills, five cold mills and three breaking-down mills. It is believed that the entire plant can be placed in operation within 60 days. The annual capacity will be about 18,000 tons of finished material. The company will make a specialty of manufacturing fine iron and steel sheets for stamping, tinning, japanning and enameling. An Eastern stamping concern will take most of the product for the present and little will be offered for sale in the open market. A. H. Geilfuss, who was identified with the Canonsburg Iron & Steel Co. for many years, is president of the company.

THE SILENT CHAIN GEAR.*

BY J. O. NIXON, PHILADELPHIA, PA.

The advantages of chain gearing for power transmission have long been recognized by the engineer, and since the introduction of the Ewart detachable link-belt in the early seventies, the use of drive chains has steadily increased, until now many million feet of driving chain are made and sold every year. While the field in which this immense quantity of chain is used is necessarily very large, it is only a small part of the whole realm of power transmission. The reasons why chain gearing has been thus limited in its application are:

1. The noise heretofore inseparable from all chain gearing.
2. The comparatively low speed limits.
3. The more or less rapid increase of noise and jar due to the stretch and wear of the chain and the wear of the wheel.

These three defects, inherent in all ordinary chains, are due to the stretch of the chain, by its elasticity and by wear, both internal and external, which make a chain, as soon as it is started up, too large for the sprocket which it was made to fit.

Fig. 1 will possibly make this clearer. The figure shows a driven sprocket wheel and a chain of the ordinary type. This chain, it is assumed, was made to fit the sprockets. However, as soon as the gear was started up, the pitch lengthened so that this is no longer the case. This lengthening of the pitch, or stretch, is due to the following causes: The pins bed in their bearings, the stress on the chain stretches the metal, which is, of course, elastic, and wear of the pins and of their bearings begins at once and is a constantly increasing factor. Add to this the decrease in root diameter of the sprocket due to wear, and we have the conditions shown in the figure, of a wheel running with a chain which is too big for it. This means that one tooth alone is doing all the work at any given time.

In the first section of Fig. 1 we have tooth *A* in action; in the second section the wheel has revolved and the chain is about to slip off tooth *A*, and in the third section the chain has slipped off, and the wheel has slipped back under the influence of the load, until tooth *B* comes in contact with the chain. This slipping back of the wheel makes a noise and causes a shock to both chain and wheel. These shocks occur every time a link passes out of mesh and, therefore, at even very moderate speeds, the number per minute is very large. It has been proved by experiment and by practice that this jarring action is very wasteful of power, and that the amount of power consumed by it increases more rapidly than the speed increases, so that the allowable useful working stress limits the speed at which a chain may be run. Of course this limiting speed varies greatly for various styles of chain and is much higher for a steel roller chain of proper design than for a malleable chain. What has been said above with reference to a driven sprocket applies with equal force to the driver.

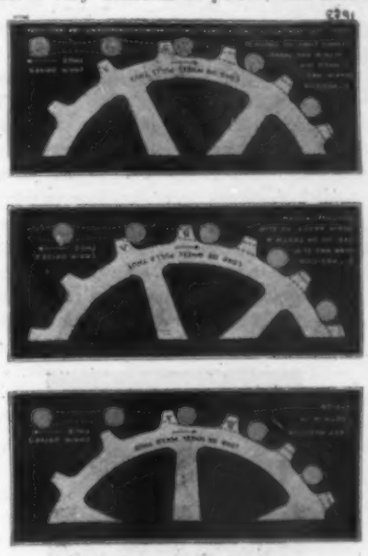


FIG. 1.—ORDINARY CHAIN AND SPROCKET.

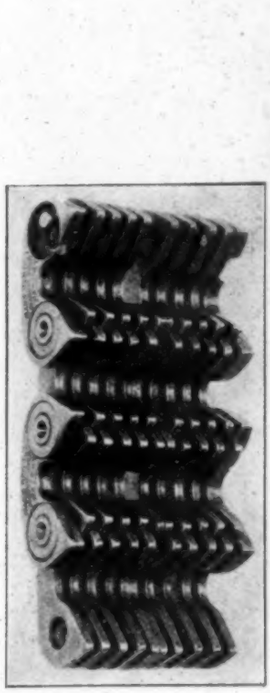


FIG. 2.—STAMPED CHAIN.

FIG. 3.—BLOCK CHAIN

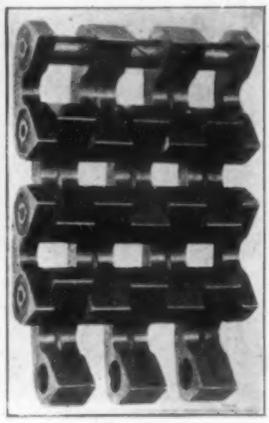


FIG. 4.—MULTIPLE BLOCK CHAIN

From the foregoing it will be immediately inferred that the solution of the problem of producing a high speed and a silent chain gear lies in the production of a wheel and chain which shall always remain a perfect fit each with the other entirely independent of the stretch of the chain. Such a chain gear has been developed by Mr. Hans Renold, of Manchester, Eng., and has been in wide and successful use in Europe for some five years past. This chain consists of a chain composed of links of a peculiar form stamped from the sheet or cut from a drawn bar fastened together by shouldered rivets into a chain of any desired width (Figs. 2, 3 and 4) running over cut sprocket wheels with teeth of a shape varying with the size of the wheel. It is absolutely

*Read at the New York meeting (December, 1901) of the American Society of Mechanical Engineers.

silent and may be run at high speeds. It is capable of transmitting any amount of power from the smallest to the greatest.

How the Renold chain gear accomplishes its results may be best seen by reference to Fig. 5. It will be noted at once that the chain has contact with the wheel on the faces of the teeth only, and not on the root circle at any time. The flat bearing surfaces of chain and wheel at corresponding angles cause the chain to take the form of a perfect circle at all times, with a pitch diameter corresponding to the pitch of the chain, and not to the pitch of the wheel, as is the case where the bearing is on the root circle. Because of the above, every tooth in mesh is in equal contact with the chain, and remains so whatever the stretch. As any given tooth goes out of contact with the chain there is no slipping back of the chain, for the next, and every tooth in mesh, is in perfect

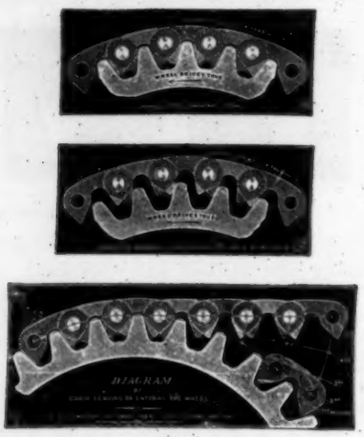


FIG 5 —SILENT CHAIN AND SPROCKET.

working contact with it. Thus there is no noise connected with the operation of the chain, and the cause which limits the speed of the ordinary chain gear does not exist. The first section of Fig. 5 shows a new chain on the sprocket; the second section shows the same chain after having stretched, and illustrates how the chain automatically adjusts itself to the sprocket, remaining always a perfect fit for it; the third section shows the rolling action of the chain as it comes into mesh. There is seen to be no sliding of the chain on the sprocket tooth, which means, of course, minimum of wear and a maximum of efficiency. The Renold silent chain gear, as Mr. Renold has named this development, is therefore noiseless; it can be run at high speeds; and it retains the originally perfect action until worn out. Another valu-

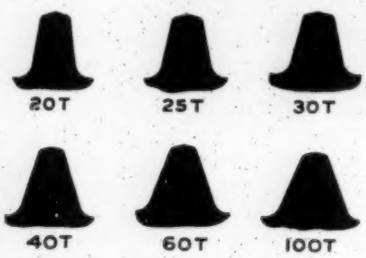


FIG 6 —SHAPES OF WHEEL TEETH.

able property, which is a corollary of the self-adjusting feature of the chain, is the possibility of running two or more chains side by side on the same wheel. In this way, when large powers are to be transmitted, and the width of chain necessary becomes too great for convenience in manufacture or in handling, several chains may be used with the perfect assurance that each will bear its proper share of the load. This is in great contrast to the known impossibility of getting two ordinary chains to stretch evenly and so distribute the load between them. As the number of chains becomes greater the difficulty by the old method is more than proportionately increased.

The life of a chain is the length of time which it will take to stretch it so much that it ceases to have any bearing whatever on the teeth of the sprocket wheels. A very small bearing will suffice, because the load is divided between all the teeth in mesh. Hence, to prolong the life of the chains, the steel used in its manufacture must be of the very highest grade obtainable, and it must be worked with the utmost accuracy. A steel for the links of high tensile strength allows the use of pins or rivets of large diameter while preserving the tensile strength of the chain as a whole. The large bearing surface so obtained is rendered yet more valuable by the use of hardened pins of high grade material. The washers on the ends of the rivets claim no little attention. They must be small in diameter and not too thick. This necessitates a steel of high tensile strength and elasticity, so that the washer shall grip the rivet end when it is forced over it and still, by its small size, not add to the bulk nor detract from the appearance of the chain.

From the question of material one naturally passes to the allowable limits of error in workmanship. In a general way it may be said that the chain should be as accurate as it is possible to make it. The pitch must be accurate, the holes

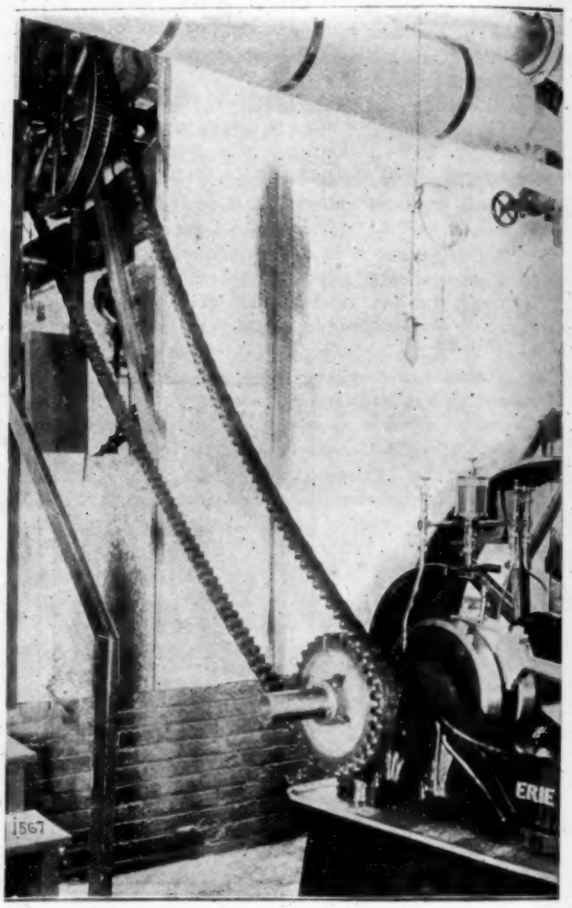


FIG. 7 —CHAIN DRIVE, 25 HORSE-POWER ENGINE TO LINE SHAFT. CHAIN SPEED 900 FEET PER MINUTE.

must be properly located, and the rivets must be neither so short as to bind the links nor so long as to give excessive play.

The sprockets used with the silent chain form, of course, an indispensable part of the gear. They must be accurately cut with special cutters and may be of any material. The teeth have straight sides to give a full bearing with the working surfaces of the chain. The angle of the tooth is different for every diameter of sprocket; or, to put it in another way, the angle between the sides of the tooth becomes greater as the number of teeth increases. The limits to the number of teeth that may be employed are practically fixed at 18 and 120. The former limit is set by the fact that in a wheel with this number of teeth, the sides of the teeth are parallel. Conversely when a wheel has 120 teeth, the tooth becomes so blunted as to make slipping a possibility, so that this number should be exceeded only where the load is absolutely uniform.

This variation of the tooth shape is illustrated in Fig. 6, which shows several steps in this gradual change of shape. It will be readily understood that the variation between the shapes shown is a gradual and not a sudden transition. The fact that the load on the sprocket teeth is distributed over all the teeth in mesh obviates the necessity of using a metal of high tensile strength for the sprocket wheels. The fact that there is no sliding of the chain on the sprocket teeth obviates the necessity of using a very hard metal to minimize wear. It is therefore possible to make a strong and durable sprocket wheel of cast iron. Steel, however, has been used for the small wheel on automobiles, and in other cases where the service was particularly severe. The flanges are put on after the teeth are cut, and are either shrunk on, or riveted to the wheel.

With regard to the practical use of the chain the following points may prove of interest: It is obviously necessary that one wheel of the pair be flanged to prevent the chain running off; it has been found that better action is obtained where the driven wheel is flanged; the chains may be run with the sprockets so close together as to barely clear, or

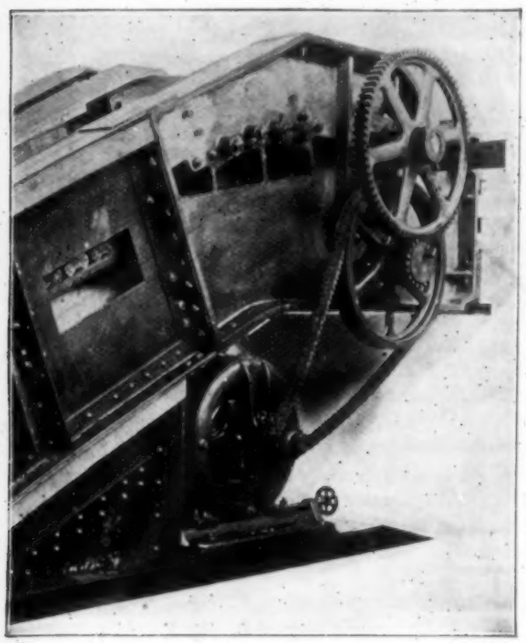


FIG. 8.—10 HORSE-POWER DRIVE ON STAIR LIFT. CHAIN SPEED 1,070 FEET PER MINUTE.

the drive may be of any length up to ten to fourteen feet without supporting idlers and, if such support be used, may be of any length found economical and desirable.

The only factor so far found which serves to limit the speed is the difficulty of keeping the lubricant on the chain at very high speeds. At speeds exceeding 1,350 to 1,400 feet per minute, the oil is thrown off by centrifugal force, but speeds as high as 2,300 feet have been employed successfully by enclosing chain and wheels and running them in oil. The particular case in mind was the transmission of 75 horsepower from the motors to the car axle on the Mono-rail Railway, at the Brussels Exposition. This is the type of road which is soon to be erected between Liverpool and Manchester.

This is by no means the only case where high speeds have been attained by enclosing the gear, but is simply cited as typical. In this connection, however, it may be well to call attention to the fact that the chain speeds being lower than the speeds necessary for belting, allows sprockets of correspondingly smaller diameters for the same angular velocities. The chain thus effects a marked economy of space, not only in the diameter of the wheels, but because of the comparatively long centres absolutely essential with belting. The line of centres may be horizontal, inclined, or vertical, provided that the shafts are parallel, but there are two limitations on vertical drives. The small wheel should not be the upper one, because the weight of the chain crowds it into the sprocket and gives bad action. Some form of tightening device should be provided, either by adjusting the centres, or by an idle roller on the slack side of the chain, so as to prevent the chain, when it stretches, from falling away from the lower sprocket. Both of these troubles may be obviated by inclining the line of centres.

Wherever the chain gear is exposed to dust or grit of any sort, it should be enclosed in a dust-tight casing. In any case, a light metal guard should be provided to prevent anything falling into the gear.

The statement was made in the beginning of this paper that the causes which had heretofore limited the use of chain gearing were the speed limit, the noise, and the more or less rapid deterioration of the action of chain and wheels. We have now seen how these three defects have been eliminated in the Renold silent chain gear, and this question naturally arises: "To what is the silent chain gear especially applicable, and how has it proved its usefulness in the past?" An answer to the latter half of this question will also be the best answer to the first half.

It is hard to name a branch of the mechanical world in which the silent chain has not made a permanent and honored place for itself. It has been used on machine tools in numberless ways; it forms an integral part of many special

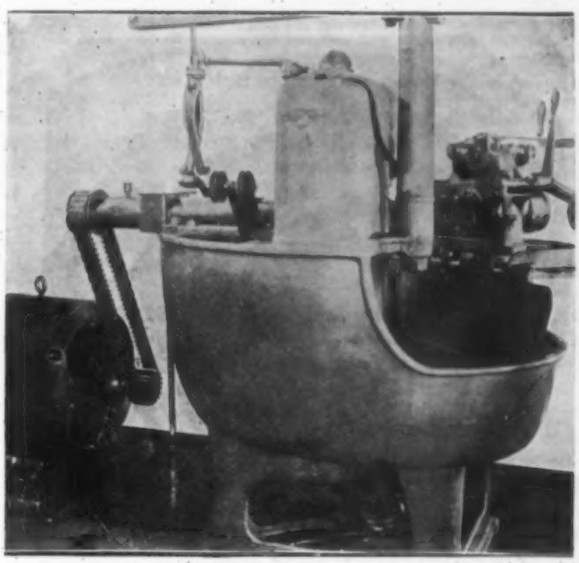


FIG. 9.—7 HORSE-POWER CHAIN DRIVE ON SELLERS GRINDER, CHAIN SPEED 1,000 TO 1,800 FEET PER MINUTE.

machines; it drives shallow-draught gunboats on the Nile, and heavy gun lathes in Sheffield. Engine governors are driven by it, and the motors whose power is transmitted through this medium are hundreds in number and of all sizes, from the smallest to the largest. Builders of automobiles of all types have found that the silent chain offers a solution of their difficulties, and it is in use today on hundreds of cars, from the light three-wheeled pleasure carriage to the heavy steam truck. In our own country, Messrs. Brown & Sharpe have been using this chain for some time for driving the spindles and feeds on their machines. The new factory of the Natural Food Co. at Niagara Falls is driven throughout by silent chain. Here the service is severe because of the sudden start and quick acceleration, under load, of the induction motors used. The drives vary in size from 1 to 40-h. p. These are only notable instances, for already the chain is in use in many varieties of service on this side of the water. Figs. 7, 8 and 9 show applications of the chain. The data as to these transmissions are given under the figures themselves.

To sum up, the Renold silent chain gear possesses, in common with all chain gears, these advantages:

1. A positive speed ratio (no slip).
2. No tension in the slack side of the chain and, therefore, a minimized loss in journal friction.
3. Adaptability to short centres or to long centres.
4. Adaptability to hot or damp situations.

In addition to these it possesses the following unique advantages:

1. It is silent.
2. It may be run at high speeds.
3. The initially perfect action is preserved throughout the life of the chain.
4. The load is distributed over all the teeth in mesh.

It is superior to leather or rubber belts because—

1. It provides a positive speed ratio.
2. There is a minimum loss in journal friction.
3. It can be used in hot or damp situations.
4. It can be used on short centres without a troublesome and wasteful idler.

It is superior to spur gearing because—

1. It is noiseless.
2. It does not require fixed centres.
3. It does not require short centres.
4. There is no sliding friction on the teeth, hence it is more efficient.
5. It is smoother in action and generally more durable.

The writer believes that no one who has given the subject even casual thought will dispute the assertion that the development of the Renold silent chain gear marks an era in the history of power transmission.

INDUSTRIAL SUMMARY.

[If you are in need of machinery of any description, please notify *The Iron Trade Review*, and we will put you in communication with our advertisers at once.]

New Buyers in the Market and Some of their Wants:—

The Detroit Galvanizing & Sheet Metal Works, Detroit, Mich., has been consolidated with the Century Rural Mail Box Co., of the same place. The new company will be known as the Briscoe Mfg. Co., and will be capitalized at $95,000. The officers of the new company are as follows: Benjamin Briscoe, president; F. H. Pettingill, vice-president; G. B. Lott, secretary; Frank Briscoe, treasurer. The new company will continue in its present location until next spring when a new building will be erected.

The Zobler Galvanizing Co., of Chicago, has been incorporated with $5,000 capital. O. Zobler, Rudolph Matz and J. J. McDougall are the incorporators.

The Parkersburg Machine Co., of Parkersburg, W. Va., has been incorporated with $25,000 capital for the purpose of dealing in all kinds of machinery. M. C. Geider, A. M. Stiles, H. B. Hogg, F. G. Davis and E. M. Treat are the incorporators.

The Keystone Metal Co., of New York, has been incorporated with $34,000 capital. D. F. Weyl, S. W. Stern and A. J. Stern are the incorporators.

The West Jersey Tube Works Co., recently incorporated with $250,000 capital, has purchased the old Cumberland Iron Works at Bridgeton, N. J., for a consideration of $35,000. The plant will be equipped with modern machinery for the manufacture of tubes.

The Leo Sliger Mfg. Co., of Fremont, O., has been incorporated with $20,000 capital. L. Sliger, C. C. Sliger, M. G. Thraves, W. S. Richards and F. E. Peterson are the incorporators. The company will manufacture a water softening solution for industrial plants.

The Lincoln Foundry Co., Hartford, Conn., was purchased at public sale last week for $12,000 by the former employes of the company. The purchasers assume a $35,000 mortgage on the plant.

The Traction and Power Securities Co., Ltd., with a capital of about $5,500,000 has been organized by Westinghouse interests in London, Eng. The British Westinghouse Electric & Mfg. Co., becomes a large shareholder in the new company. The company is said to be similar to Westinghouse, Church, Kerr & Co., one of the Westinghouse interests which operates in the United States.

The Homestead Hardware Co., Homestead, Pa., has been incorporated with $12,000 capital. M. McConnon, P. O. Boyd and J. M. Wright are the incorporators. The company will carry on a general hardware trade.

The sale of lots to insure the erection of a plant at Norwalk, O., by the Norwalk Iron & Steel Co., commenced last week and only a few lots remain unsold and the project will no doubt be carried out. The plans call for a main building 120x600 feet to be equipped with a 16-inch roll train, heating furnaces, etc.

The Jackson Knife & Shear Co., of Fremont, O., has been granted a Delaware charter with a capital of $325,000. The company will manufacture cutlery, etc.

C. K. Hill is equipping an electrical supply plant at the corner of Liberty and Seventh Avenues, Pittsburg, and is in the market for lathes, planers, drill presses and general machine shop equipment.

The Abbott Electric & Novelty Co., capital $60,000, which is erecting a plant at Warren, O., has elected the following officers: H. H. Hammond, Cleveland, president; E. D. King, Warren, O., vice-president; W. J. Peck, Warren, O., secretary, treasurer and superintendent. The plant will include a brass foundry.

The Phœnix Iron Works, of Portland, Ore., has been incorporated with $20,000 capital. M. G. Wolff, Samuel Morrow and Louis Steinhauser are the incorporators.

A company will be organized at Henderson, Ky., with a capital of $100,000, to manufacture the McCallum steel wagon.

The Heck & Marvin Co., of Findlay, O., has been incorporated with $50,000 capital to conduct a general foundry. O. T. Gerhart, W. T. Heck, A. C. Heck, Cloyd Marvin and W. B. Gerhart are the incorporators.

The American Diesel Engine Co., of New York, has been incorporated with $2,500,000 capital. A. L. Curtiss, M. Hyman, D. W. Morrow, N. A. Smyth, G. Sumner, H. Walker and J. C. Walker are the incorporators.

The Haring Cotton Machine Co., of Golaid, Tex., has been incorporated with $15,000 capital. The company will manufacture cotton machines. R. R. Lemaster, Clark Denton and L. Seeligson are the incorporators.

The Crescent Machine Co., of San Francisco, Cal., has been incorporated with $12,500 capital. C. E. Perry, E. C. Perry, C. B. Petterson and C. E. Kemp are the incorporators.

The New York Metal Specialty Mfg. Co., of New York, has been incorporated with $10,000 capital. A. W. Hoffman, Philip Harnischfeger and A. P. Dienst are the incorporators.

Fires and Accidents:—

The David Long Foundry, New Haven, Pa., was destroyed by fire last week, entailing a loss of $7,000.

The foundry of the Becker-Brainerd Co., Boston, Mass., was damaged to the extent of $3,000 by fire last week.

New Construction:—

The John N. Robins Co., New York, N. Y., is building an extension to its boiler shop at Brooklyn, N. Y., 150 feet long and 90 feet wide. This will practically double the size of the shop and additional punching and shearing machinery and cranes will be installed.

The plant of the Dayton Coal & Iron Co., Dayton, Tenn., will be greatly improved by the expenditure of $65,000, recently decided upon by the directors for improvements.

The Monessen Foundry & Machine Co., Monessen, Pa., has awarded the contract for the erection of a new foundry 72x250 feet to the American Bridge Co. A site of five acres has recently been purchased on the Monongahela river for $25,000, upon which the foundry will be built. A large amount of new foundry equipment will be required in the plant and as soon as completed the old foundry now operated by this company will be abandoned.

The Lehigh Foundry Co. is making preparations to erect a new foundry at Fullerton, Pa., to take the place of the foundry destroyed by fire last summer.

The plant of the National Wire Corporation, New Haven, Conn., which was destroyed by fire some time ago, is being rapidly rebuilt and will be placed in operation early next spring. When completed the output will be about double that of the old plant.

The National Steel Foundry Co., recently incorporated with $250,000 capital, has decided to locate its plant at Sharon, O., which is about 14 miles from Cincinnati. Two buildings each 500 feet long and 63 feet wide will be erected on the site secured. The buildings will parallel each other and a space 100 feet wide will separate them. Tracks will be laid

therein, however, to facilitate the handling of both raw and finished material. The one building will be equipped with molding machines for the manufacture of duplicate castings for railroad work while the other building will be reserved for general steel castings. C. G. Robinson, formerly assistant superintendent of the Pennsylvania Steel Co., will be manager of the plant.

The Dillon-Griswold Wire Co., Sterling, Ill., will build a new dippery, 60x100 feet.

The Cleveland Rivet & Forge Co. is in the market for two machines for pointing lag screws.

F. J. Vlchek, 1612 Central avenue, Cleveland, manufacturer of stone cutter's tools, is in the market for a belt-driven hammer, 50 to 100 pounds.

The Pittsburg District:—

The McKeesport Mfg. Co., of McKeesport, Pa., recently incorporated, with a capital of $550,000, will build a tin plate plant at Port Vue, across the Monongahela river from McKeesport. A site of 14 acres has already been purchased and contracts for the buildings will shortly be awarded.

The Crucible Steel Co. of America is erecting an addition 35x70 feet to the plant of Anderson, DuPuy & Co., at McKees Rocks, Pa. It will be utilized in the manufacture of springs and will double the capacity of the spring department.

The American Locomotive Co. has purchased the site of the DeHaven Stove Foundry, Allegheny, Pa., from the Pittsburg Stove & Range Co., for a consideration of $100,000. The property is located on Preble Ave., Allegheny. The Pittsburg Stove & Range Co., disposed of this property for the reason that it will centralize all its plants at Beaver Falls, Pa., where a site of 26 acres has been secured.

The Kelly & Jones Co. will erect a ten-story warehouse on Water St., Pittsburg. The cost of the building will be $150,000.

The McFeely-Wheeler Brick Co., of Pittsburg, Pa., with offices in the Times Bldg., has been organized with a capital stock of $30,000. Five acres of land have been purchased at Latrobe, Pa., adjoining the property of the Superior Coal & Coke Co. A new plant with a capacity of 10,000 silica brick per day has already been completed and orders are already closed for 150,000 brick. F. B. McFeely is president; G. Y. Wheeler, secretary, and J. H. McFeely, vice-president.

The Carnegie Steel Co. has sold its natural gas business at Munhall, Pa., to the Philadelphia Co., of Pittsburg. The transfer will be made on Jan. 1.

Application for a charter for the Duquesne Malleable Iron Co., of Pittsburg, has been made at Harrisburg. The proposed capitalization is $175,000. The company will build a plant near Pittsburg at a point yet to be determined. E. J. Frauenheim, C. A. Fagan, L. Vilsack, W. A. Magee and C. T. Moore are the incorporators.

The winter meeting of the Western Pennsylvania Central Mining Institute will be held in the court house, Pittsburg, Wednesday and Thursday, Dec. 18 and 19.

McClure & Co., Pittsburg, manufacturers and dealers in tin plate, have been compelled to abandon the erection of their new six-story warehouse in the Point district at a cost of $100,000, as the site is to be acquired by the Wabash railroad interests. Another site is under consideration, the building project not having been abandoned.

A large addition is being erected to the plant of the Pittsburg Meter Co., East Pittsburg, Pa.

The British Westinghouse Co., one of the allied Westinghouse interests, will be awarded the contract for equipping the London underground railways with electricity.

At a meeting of the Monongahela Valley Retail Hardware Dealers' Association held at Pittsburg last week it was decided to make the society a state organization. The body will be known as the Pennsylvania Retail Hardware Dealers' Association and will become a part of the National organization.

The West and Northwest:—

The Novelty Stove & Mfg. Co., Savannah, Mo., has commenced work on a new foundry that will cost $10,000 to build and equip.

The Studebaker Bros.' Mfg. Co., South Berd, Ind., has been reorganized and new officers elected as follows: President, J. M. Studebaker; first vice-president, Col. George M. Studebaker; treasurer, Clement Studebaker; secretary, J. M. Studebaker, Jr. N. J. Riley continues as second vice-president.

The Franklin Galvanized Wire Co., Franklin, Ind., is reported to be making arrangements for a new factory.

Charles H. Besly & Co., Chicago, has let contracts for an addition to its plant at Beloit, Wis.

The Berlin Machine Works, Beloit, Wis., is receiving bids for the erection of five new shop buildings, which will be built at a cost of $100,000.

The Thomas Elevator Co., Chicago, has been organized with a capital stock of $30,000. The incorporators are Emmet F. Thomas, Elden A. Votaw and Percy Reidy.

Pringle & Brodie Machinery Co., Chicago, has been organized with a capital of $25,000. The incorporators are George W. Pringle, William Brodie and John C. Pirie.

The Chicago Asbestos Mfg. Co., Chicago, has been incorporated with a capital of $4,000 to manufacture asbestos, mineral wool, hair felt, etc. The incorporators are David Q. Stephens, George A. Vandergrift and William E. Stout.

The Union Drop Forge Co., Chicago, now has orders on its books for complete drop forgings for the manufacture of 12,000 automobiles. The company is equipping one of the largest tube plants in the country with its oil burning apparatus.

General Industrial Notes:—

The plant of the Wolff & Zwicker Iron Works, Portland, Ore., was sold by the order of the court last week for $42,000 to D. C. O'Reilly. H. G. Pratt acted as receiver of the company.

The Empire Foundry Co., New Brunswick, N. J., which recently acquired the plant of the New Brunswick Foundry Co, also purchased the plant of the old Empire Foundry Co. The latter plant will be dismantled.

The Harrisburg Foundry & Machine Co., Harrisburg, Pa., has received an order for a 350-h. p. engine from the Farrel Foundry & Machine Co., Ansonia, Conn.

The records established in October in the mills of the Bethlehem Steel Co., South Bethlehem, Pa., were broken during the month of November. The blooming and structural mills all made new records while the open-hearth steel output was the greatest in the history of the company.

Work on the main building of the McMyler plant at Warren, O., will be commenced shortly. The building will be 307 feet long and 104 feet wide.

The annual meeting of the stockholders of the American Tin Plate Co. will be held in Jersey City, N. J., on Jan. 21. Practically all the stock of the company is owned by the United States Steel Corporation.

The plant of the Paterson Iron & Steel Forge Co., Paterson, N. J., recently destroyed by fire will not be rebuilt.

The Bates Machine Co., Joliet, Ill., has commenced suit for $125,000 damages against A. J. Bates, one of the stockholders and promoters of the company. The company is suing to recover on patents alleged to have been signed over to the company by the defendant.

The Flour City Ornamental Iron Works, Minneapolis, Minn., has been awarded the contract for the ornamental iron work for the Kansas State Capitol building. The contract price is $30,000.

The Crossman Edge Tool Co., West Warren, Mass., recently organized to manufacture edge tools, will soon place its plant in operation. An abandoned manufacturing plant has been leased and the installation of machinery has been commenced.

The Pennsylvania Steel Co., Steelton, Pa., has been awarded a contract for 2,500 tons of 60-pound rails for shipment to Mexico.

C. R. Baird, of the Philadelphia, Pa., concern of C. R. Baird & Co., is now suing to secure $91,593.14 from the Elmira Steel Co., Elmira, N. Y. Mr. Baird alleges that this amount is due him for reorganizing the Elmira Co.

The Hannah furnace at the Valley works of the Republic Iron & Steel Co., Youngstown, O., resumed operations last week after an idleness of nearly a month, caused by the failure to secure coke shipments.

A NEW COIL CLUTCH.

The main principle of this clutch is based upon the well-known phenomenon attendant upon the winding of any flexible material around a rotating shaft. A rope, for example, made fast at one end and wound three or four times around the shaft acts as a powerful brake, provided the shaft be running in the direction necessary to tighten the convolutions. A slight pull applied to the free end of the rope is multiplied by every turn and an intense pressure is obtained. The clutch under consideration is founded upon this principle. Instead of the rope, however, there is substituted a coil or helix of square steel so designed that the free end or tail may be made to grip or release the rotating shaft at pleasure. When one end of such a helix is attached to a pulley and the other end is made to grasp the shaft, motion can be transmitted from the one to the other in consequence of the frictional grip of the helix on the shaft. There is necessarily an elastic connection between the parts and if they are well proportioned to the work the clutch may be thrown into gear without shock, sufficient slip taking place to render the start quite easy; at the same time it is absolutely positive.

The general principle may be worked out in a number of forms according to the needs or individual taste of the designer. The wide range in sizes obtainable by this construction is a surprising feature in this class of clutch. Ordinarily, a friction clutch to transmit several hundred horse-power at average speeds is a serious and expensive undertaking; but of recent years clutches have been made of sufficient size to convey several thousand horse-power. These are operated with little trouble to the workman and there is no appreciable end thrust on the shaft. All that is necessary with the coil clutch in order to effect engagement is to bring the end of the helix into frictional engagement with the shaft, or with a sleeve upon the shaft, and then the successive convolutions tighten themselves up until a most intense grip is attained. In practice this grip is too great to be imposed upon a soft iron or steel shaft and is always taken on a chilled cast iron sleeve. The sleeve is carefullly ground to a fine surface and it is claimed will not show appreciable wear to such an extent as to interfere with the continued action of the device. The sleeve is made tapering in some cases and a taper coil is thrust up the coned circumference. It is easy in this form to cause a very gradual engagement and in fact to so graduate the friction on the point of the coil that the clutch will slip should a determined strain be exceeded. The coil is drawn down the cone to effect disengagement; the force required for this purpose being exceedingly small, as it is applied to the last coil which has only a comparatively slight grip. As soon as this end coil weakens its hold on the sleeve, all the others release themselves at once.

A clutch of this description is shown in Fig. 1, as employed in coupling shafts together. One part of the coupling is permanently attached to the end of one of the shafts by a key, a sleeve slides over a fixed key along the corresponding portion of the other shaft; the sleeve is coned to fit a similar bored taper in the helical spring, and the latter acts against a suitable abutment in the coupling, as clearly shown in the engraving. This design is specially adapted for coupling shafts, for driving pulleys at high speeds as well as gearing up explosive engines in oil-propelled launches and motor cars. The coil clutch is particularly adapted for the last named purpose as the engagement may be made gradually; a valuable feature in the case of a machine handled under such unusual conditions as are to be found incidental to road locomotion. The delicacy of the device permits its adaptation as a clutch and a brake at one and the same time. For example, if such a clutch be fitted to a hoist or crane, the load may be held stationary in mid-air whilst the engine is in motion, the friction between the coil and the sleeve being so readily graduated that the load neither runs up or down. When the hoist is intended to be driven both ways by power, then a double-acting coil is fitted, consisting of a central head with right and left convolutions on either side so that the load may be controlled by the clutch either in ascending or descending.

Fig. 2 illustrates another type of coil clutch. Here the sleeve is turned parallel and the coil is bored slightly larger. One end of the coil is made fast to the shaft or pulley, while the other is turned outwardly. A collar having a taper finger is capable of sliding along the shaft, the pressure of the taper finger against the outwardly turned end of the coil causes it to wind up the helix and thus grip the sleeve and drive the shaft or pulley as the case may be.

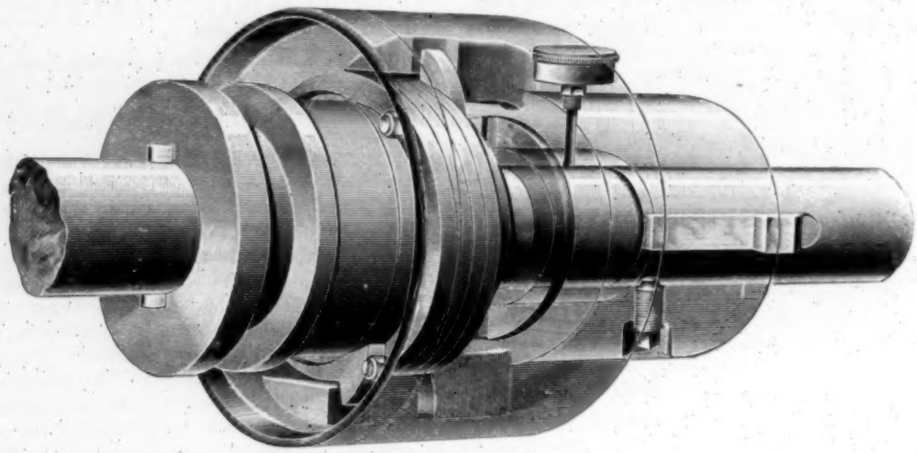


FIG. 1.—CONE-OPERATED COIL CLUTCH.

A number of these coil clutches are in use abroad for heavy rolling mill service. One of them is installed at the plant of the Volga-Vischera Iron Works, Moscow, Russia. It is of extremely massive construction and weighs 128 tons and is employed for driving and reversing a train of rolls demanding some 12,000-horsepower. The clutch makes 30 revolutions per minute and the rolling mill is used in the production of 12-inch armor plate. The mill is driven by means of two shafts; one is driven directly from the engine and is made in two parts, the division occurring between the first pinion and the corresponding clutch. The second half of the shaft is supported by being turned down and fitted into a recess bored into the end of the first part of the shaft. This recess is bushed with gun metal. At the outer end of the second part of the shaft is a wabbler for connection to the rolling mill. The two shafts are connected by two trains of gearing, one containing two, and the other three, gears. When the mill is driven in one direction the power is transmitted through these five gears; and when it is driven in the other the two parts of the shafts are rigidly connected and the gears run idly. The necessary changes to obtain a reversal in either direction are made by means of two clutches; the coil of the first is rigidly attached at one end to a pinion keyed to the shaft. The coil is wound around a chilled sleeve keyed to the other part of the shaft in such a direction that it tends to tighten itself when any drag is put on the point of the coil to give it an initial grip. When this clutch holds, the two parts of the shaft become

connected and the power is transmitted directly from one to the other. The second clutch coil is connected to the last wheel of the train and is wound around a sleeve keyed on the second part of the shaft. When it grips the sleeve, the first clutch being loose, the two ends of the wheel train are connected to the two parts of the shaft which then run in opposite directions.

The two clutches are operated by a hand wheel and screw connected to a bell-crank lever. The lever slides a double-faced disc along the shaft and presses either face against the finger, which tightens the corresponding coil, the smallest movement causing the coil to wind up and obtain a firm and powerful grip on the chilled sleeve.

The coils are forged from steel bars, gradually tapering towards the point; the varying section supplies the strength at the point where it is needed and renders the coil more elastic and delicate in action. It is so sensitive that a small boy can reverse a rolling mill several times a minute; immediately the pressure is released from a coil it liberates with absolute certainty, while the moment it is pressed it takes up its work without noise or shock. The clutch sleeves are of deeply chilled cast iron, ground to a fine surface; naturally there is an enormous pressure on them and it is for this reason that they are made as hard as possible.

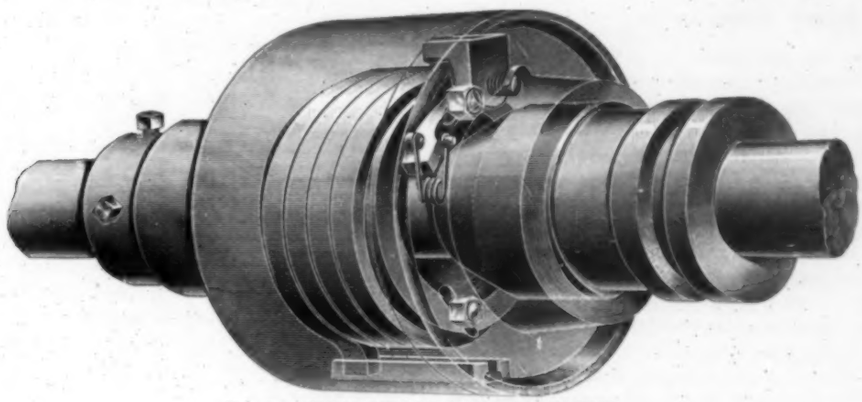


FIG. 2.—HEAVY DUTY TYPE OF COIL CLUTCH.

These clutches are made under the Lindsay patents by the Coil Clutch Mfg. Co., of 45 Broadway, New York.

Standard Steel Car Co.

An application for a charter for the Standard Steel Car Co, of Pittsburg, will be made on Jan. 2. The company will be capitalized at $2,000,000, but this is nominal and will be increased later. The plant is to have an output of 50 cars daily and it is stated that contracts for the buildings have already been let, although a confirmation of this report could not be secured. J. M. Hansen, one of the incorporators, and who will be president of the company, has been chief engineer of the Pressed Steel Car Co. and assistant to the president since the company's inception. He has tendered his resignation to the Pressed Steel Car Co. to become effective Jan. 1. H. J. Geahart, another incorporator of the new company, has been auditor of the Pressed Steel Car Co., while P. F. McCool, a third incorporator, has been one of the superintendents of the McKees Rocks, Pa., plant of the Pressed Steel Car Co. for several years. He has also resigned his position.

A press dispatch credits J. J. Hill of the Northern Pacific with backing the new company, and with an effort to secure control of the Pressed Steel Car Co. It is reported to be the ultimate intention of those behind the Standard Steel Car Co. to build blast furnaces, steel works and plate mill plant to secure their own supply of material.

The stockholders of the Standard Seamless Wire Co., Pawtucket, R. I., at a recent meeting decided to consolidate with the Burden Wire & Supply Co., of Providence, R. I. It is probable that the Pawtucket plant will be removed to Providence.

FUTURE OF THE COLORADO FUEL & IRON CO.

Wm. Garrett, of the Garrett-Cromwell Engineering Co., furnishes the following concerning the plans and possibilities of the Colorado Fuel & Iron Co., which has important improvements under way at its Pueblo, Col., plant:

"Previous to 1863, I question if any iron of any kind was made at Chicago; since that time Pittsburg has grown up amongst us, that makes more iron and steel today than Great Britain did 30 years ago. Pennsylvania produces 52 per cent of the rails made in this country today, and Illinois 26 per cent. Forty years ago I question if any steel were made west of the Allegheny mountains, but 'westward the course of empire takes its way,' and one of the most striking developments in extensive additions and improvements now under way is that of the Colorado Fuel & Iron Co., Pueblo, Col. In 1885, Colorado provided only 5,480 tons of pig iron; in 1899, a little over 100,000 tons was produced—a gain of over 1,900 per cent. Pennsylvania in 1885 produced 2,445,000 tons of pig iron; in 1899, over 5,134,500 tons were produced, or a little over 100 per cent.

"When all contemplated additions are completed, the Colorado Fuel & Iron Co. will produce over 1,000,000 tons of pig iron annually, all of which will be made into finished material, including rails, plates, sheets and tin plate, structural steel, merchant steel, bars of all sizes, hoops, cotton ties, wire rods, wire nails, fence wire and wire of all descriptions; and when this is in full operation not less than 25,000 men will be employed in all the departments, including those employed at the coal mines, coke ovens, blast furnaces and quarries. Then specifications can be filled to build a steamship, steel cars, all sizes of structural steel for building, open-hearth steel of the highest quality, merchant steel of all grades and sizes, wire for every purpose—in fact, covering the ground for making all sizes, shapes and quality of open-hearth and Bessemer steel required in this country excepting armor plate.

Sources of Raw Material.

"In the way of raw material, the Colorado Fuel & Iron Co. is more than fortunate, a late acquisition being the Bessemer ore mines in Wyoming. In reference to fuel, it is the largest producer west of the Mississippi river and the only company having anthracite coal; and many of the soft coal mines produce coal of a quality equal to the Pittsburg and Connellsville districts for coking purposes.

"In a recent interview with Mr. Carnegie, he was told that C. M. Schwab stated that the Bessemer ore supply would be exhausted in 30 years; Mr. Carnegie replied that Mr. Schwab was a young man and that he would last longer than that. From the present indications alone, the supply of ore within sight, owned by the Colorado Fuel & Iron Co. would outlast even Mr. Schwab. As an indication of the plentiful supply of low phosphorus ore—there are immense deposits of high phosporus ore as well—some time ago the question arose whether in extending their steel plant, should they adopt the Bessemer or the basic open-hearth process, they decided in favor of the Bessemer ore, owing to the plentiful supply of low phosphorus ore they had on hand. Their ore is of the richest character, having from 62 to 68 per cent metallic iron.

"They have excellent coking coal; have their own coke ovens of the latest type; limestone of the best quality and all their raw material is within a reasonable distance from their steel plant. There is no reason why they cannot make pig iron and finished steel material of all kinds as cheaply as anywhere in the world—first, owing to the raw material being so accessible, and their whole blast furnace and steel plant being of the most modern type.

"The average cost of coal, coke and iron ore is less than the average cost of same materials in Pittsburg, and despite the fact that the United States Steel Corporation have connected with them some of the brainiest men in the iron and steel business in this or any other country, yet it is to be hoped for the future welfare of this country that, while they have almost a monopoly on Bessemer ore and coal in the East, and are closely identified with all the railroads of the East and Central States, they have no monopoly on the brains of the whole country. This is clearly evident when we find connected with them such men as J. G. Osgood, John W. Gates, John Lambert and Mr. Kebler—men of pronounced ability and acknowledged to be among the most successful in this country as managers and financiers; hence, why should the Colorado Fuel & Iron Co. not be able to make iron and steel cheaper than that of the above big corporation if they can get their raw material cheaper.

Western Markets for Steel.

"It might be said that the United States Steel Corporation, having Pittsburg as its center, is in the center of a large market for its product; but when we observe the great competition that is springing up all around her, and that but a few years ago material made from iron and steel was shipped thousands of miles across the ocean—a surplus that the home market could not use—and when we think that the freight from Pittsburg to Liverpool is less by far than that from Pittsburg to some of the Middle and Western States, one need only to look at the map and see that Chicago is the nearest manufacturing point from Colorado—Chicago that has to get her coke from the Connellsville district—to find that Colorado with Pueblo as its manufacturing point is like an oasis in a large desert, surrounded on all sides by States which have not been blessed by nature with the raw material to make iron and steel.

"When we observe that Colorado is bounded on the north by Wyoming and Nebraska, on the south by New Mexico and Oklahoma, on the west and southwest by Utah and Arizona, on the east by Kansas and Nebraska, then note circling among these States, old Mexico, California, Nevada, Oregon, Washington, Idaho, Montana, North and South Dakota, all thriving states and territories, the home of the cattle raiser, farmer and miner, which has the better market, Pittsburg or Pueblo?

"The effect of the success of the Colorado company will be most striking. The farmer and cattle raiser will pay less for his wire fencing and wire nails and have more money to spend for luxuries. The same with the miners and railroad builders using structural material. The vines of California, the cattle of Texas, Wyoming and other neighboring states and territories will be sustained by and inclosed by wire made in Pueblo, and not made in Pennsylvania, Ohio or Illinois. Railroads in the near east and west will carry freight and passengers on Pueblo rails, cars made from Pueblo plates and structural material,, and ships at anchorage in San Francisco Bay, bearing the American flag, made from steel plates rolled at Pueblo; the tin cup of the Mexican greaser, the water pail of the cowboy, the milk pans of the farmers, tin cans for the fish of the Pacific coast and for the fruit of California, the hut and the palace having roofing tin, for railroad car roof covered with sheet steel and kitchen utensils used by the highest and lowest of the above-named States, all made from tin plate and sheet made from raw material by the Colorado Fuel & Iron Co.

"This is no fancy sketch, but more than probable in the near future. But are they able to build steamships on the far Western Pacific coast, which is at present thousands of miles from the nearest point of land and many thousands of miles by sea to where they can get the necessary material? In reply we point to our battleship, the Oregon, the pride of the United States navy, whose achievement from a mechanical and sea-fighting point of view has never been surpassed. One would think so far as the course of empire or pre-eminence in shipbuilding is concerned that it has rested at the extreme west of our country and that something in the nature of an iron and steel manufacturing point in the very middle of our Western states—such as is now being enlarged at Pueblo—was all that was necessary to fill up the gap between our empire in the East and our empire in the West, to verify Bishop Berkley's remark to the utmost degree."

OUTPUT OF BLAST FURNACES OF UNITED STATES.*

December 1, 1901.

Location of Furnaces.	Coke and Anthracite.					Charcoal.				
		In Blast.		Out of Blast.			In Blast.		Out of Blast.	
	Total No. of Stacks.	Number.	Weekly capacity.	Number.	Weekly capacity.	Total No. of Stacks.	Number.	Weekly capacity	Number.	Weekly capacity.
New York	14	5	6539			3	1	649		
New Jersey	7	4	4130							
Spiegel	3	3	540							
Pennsylvania:						13	2	93		
Lehigh Valley	28	17	9780							
Spiegel	1	1	139							
Schuylkill Val	15	12	9747							
Upper Susqu Val	2	1	1113							
Lower Susqu. Val	9	5	5312							
Spiegel	1	1	278							
Lebanon Valley	12	10	8393							
Pittsburgh Dis't	33	30	75576							
Spiegel	1	1	2590							
Shenango Valley	16	15	21670							
West'n Pennsylvania	20	14	16569							
Spiegel	1	1	721							
Maryland	5	4	5446			4	0	0		
Wheeling District	9	9	13667							
Ohio:						8	4	238		
Mahoning Valley	15	14	25598							
Central & Northern	14	12	22054							
Hocking Valley	2	1	467							
Hanging Rock	12	10	6489							
Illinois	15	13	29427							
Spiegel	2	2	1866							
Minnesota	1	0	0							
Wisconsin	4	2	2247							
Missouri	1	0	0							
Colorado	2	2	5200							
Spiegel	1	1	400							
Virginia	20	14	9166			3	2	114		
Kentucky	5	4	1627			3	0	0		
Alabama	35	21	22326			4	3	1007		
Spiegel	1	1	113							
Mich., Mo. and Wis.						10	7	4195		
Tennessee	15	10	7331			5	2	516		
Georgia	1	0	0			4	1	404		
North Carolina	1	1	437							
New England						7	3	187		
Texas						4	0	0		
Utah										
Oregon										
Totals	327	241	317358			68	25	7403		

SUMMARY.

Fuel.	In Blast.						Out of Blast.			
	Number.			Weekly Capacity.			Number.		Weekly Capacity.	
		Month Previous.	Year Previous.		Month Previous.	Year Previous.		Month Previous.		Month Previous.
Charcoal	25	22	32	7,403	7,049	6,779	43	45		4,970
Coke and Anthracite	241	237	179	317,358	313,775	222,067	86	86		57,550
Total	266	259	211	324,761	320,824	228,846	129	131		62,520

*Condensed from the *Iron Age*. The decrease of unsold stocks, so far as these are reported (none of the stocks of the steel companies being included), was from 273 251 tons Nov. 1, to 223,462 tons Dec. 1, or about 50,000 tons.

By the collapse of the Hartman Mfg. Co., of New Castle, Pa., the former owners of the Cuyahoga Steel & Wire Co., Cuyahoga Falls, O., have again come into their property. At a meeting of the stockholders held last week E. A. Henry was re-elected president and manager and H. B. Hamlen, treasurer.

On Jan. 1 the Detroit Bridge & Iron Works will formally go out of existence. Since the absorption of the plant by the American Bridge Co. the plant has retained its identity for taxation purposes, but after the first of the year the plant will be known as the Detroit plant of the American Bridge Co.

PRESIDENT SCHWAB AND SENATOR HANNA ON CONCILIATION.

NEW YORK, Dec. 17.—There has been a disposition to assert that the efforts of the National Civic Federation thus far in the direction of conciliation in labor disputes have resulted in little beyond mutual expressions of interest and the conviction that peaceable means are best. The meeting of prominent capitalists and representative labor union leaders now in session at 203 Broadway as arranged by the National Civic Federation, promises to have an outcome of more practical import than anything yet resulting from such conferences. Among those present at the sessions of yesterday and today at which Oscar A. Straus, formerly minister to Turkey, presided, were C. M. Schwab, M. A. Hanna, S. R. Callaway, Theodore Marburg, the tobacco manufacturer of Baltimore; Charles A. Moore, John G. McCook, William H. Pfahler of Philadelphia, Bishop Potter, Archbishop Ireland, E. D. Durand, secretary of the United States Industrial Commission; James B. Reynolds, who is to be secretary to Mayor Low; John Phillips of the Hatters' Union, James Ryan of the Typographical Union, Vice-President John J. Donnelly of the New York Bricklayers' Union and other members of local unions.

President Schwab on being called upon to speak said: "I am here with a mind open to conviction, anxious to see the other side of the shield, as Bishop Potter has said, and ready to do that which is fair. It may be that this is a selfish motive, but I realize that upon the peaceful adjustment of the difficulties that exist between capital and labor depends the future prosperity of the United States. The decadence of trade in other countries is due to the hostility of labor unions. I do not deny that capital has been arbitrary and unfair. I am not opposed to labor unions per se, but I am against them as they are now constituted. There is one point we must bear in mind—that labor unions will never succeed, as trusts never succeeded, which attempt to restrict the output or attempt to put any restriction upon trade in general. These great trusts that are formed in a business way to control the output of any commodity to raise its price—they all have failed, and all will fail. A trust will succeed where there are motives of consolidation for economy's sake and for regulating trade generally. And the laborer must take a similar position. Labor must not restrict the output. That is a fundamental principle. And I am sorry to say that every labor organization with which I have had experience has had as its foundation the restriction of the output.

"I hope that this conference will result in good. I have said more than I expected to say. I shall speak frankly whenever I do speak. I am opposed to labor organization as it is today organized. I should not be opposed to organized labor if organized on correct principles."

In introducing Senator Hanna, Chairman Straus read a statement made by the former, in which he said: "I would rather have the credit of making successful the movement to bring labor and capital into closer relations of confidence and reliance than be President of the United States." When he stood up to address the meeting Senator Hanna said those were his sentiments. He related an experience he had with coal miners in Ohio many years ago, and said that the experience had made him an advocate of unionism. "I saw then," he said, "and I believe that labor and capital could be brought together. I believe that the day is at hand for their peace, and I am willing to give the best that is in me while life lasts to bring labor and capital together. A settlement of the question will do more for good government, good morals, good social relations than anything else that we could accomplish. To the end of all this I freely give whatever service I can render to this association." Senator Hanna's speech drew apologies from John Phillips and John J. Donnelly, two of the labor delegates present, who confessed that they had held erroneous and unjust views as to the attitude of the Senator toward organized labor. Both expressed their approval of the principle of arbitration and conciliation and asserted that for years the hatters and bricklayers in New York had maintained satisfactory relations with the men who employed them.

Today's sessions of the conference were important, as they resulted in the appointment of an executive committee which is expected to work in a practical way for the furtherance of conciliation and arbitration. Frank P. Sargent, of the Brotherhood of Locomotive Firemen, Samuel Gompers and John Mitchell were the leading speakers today. The decision to appoint an executive committee of 36 was reached on the motion of President Sargent. The following names were announced and approved for such committee:

To represent the employers and capitalists: United States Senator Mark A. Hanna; James A. Chambers, president American Glass Co., Pittsburg, Pa.; William H. Pfahler, president National Association of Stove Manufacturers; S. R. Callaway, president American Locomotive Co.; Lewis Nixon, president of the Crescent Shipyard, Elizabethport, N. J.; Charles M. Schwab, president United States Steel Corporation; H. H. Vreeland, president of Metropolitan Street Railway Co., New York; Charles A. Moore, of Manning, Maxwell & Moore; John D. Rockefeller, Jr.; E. D. Ripley, president Atchison, Topeka & Santa Fe railroad; Marcus M. Marks, president National Association of Clothing Manufacturers; Julius Kruttschnitt, general manager Southern Pacific railroad.

To represent organized labor—Samuel Gompers, president American Federation of Labor; John Mitchell, president United Mine Workers; Frank P. Sargent, grand master Brotherhood of Locomotive Firemen; Theodore J. Shaffer, president Amalgamated Association of Iron, Steel and Tin Workers; James Duncan, secretary Granite Cutters' Union; Daniel J. Keefe, president International Association of Longshoremen; James O'Connell, president International Association of Machinists; Martin Fox, president Iron Molders' Union; James E. Lynch, president International Typographical Union; Edward E. Clark, grand master Brotherhood of Railway Conductors; Henry White, secretary Garment Workers of America; Walter MacArthur, editor *Coast Seamen's Journal*, San Francisco.

To represent the public—Ex-President Grover Cleveland, Archbishop John Ireland, Bishop Henry C. Potter, Charles Francis Adams, Boston; Cornelius N. Bliss, ex-Secretary of the Interior; Charles W. Eliot, president of Harvard University; Frank MacVeagh, Chicago; ex-Comptroller of the Currency James H. Eckels; John J. McCook, attorney, of this city; John G. Milburn, of Buffalo; Charles A. Bonaparte, Baltimore. Chairman of the conference, Oscar S. Straus, and Secretary Ralph M. Easley are ex-officio members of the committee.

A subcommittee of three to consider, plan, scope and procedure was appointed. The executive committee will meet tomorrow for organization, the election of officers and the drafting of a plan upon which to work.

Pneumatic Tool Consolidation.

Negotiations have been in progress for some time looking to the organization into one company, under the name of the Chicago Pneumatic Tool Co., of the following concerns: Chicago Pneumatic Tool Co., Chicago; Tate-Howard Pneumatic Tool Co., London, Eng.; Boyer Machine Co., Detroit, Mich.; Franklin Air Compressor Co., Franklin, Pa., and the Chisholm & Moore Co., Cleveland, in part. Of the last-named company only the crane and air hoist departments will be included in the new concern. It is expected that the deal will go through this week, all the preliminaries having been agreed upon. The new company will have a capital of $10,000,000, of which $7,500,000 will be in stock, and $2,500,000 in bonds. J. W. Duntley, president of the Chicago Pneumatic Tool Co., will be president of the combination, but no other officers have been agreed upon as yet. It can be stated that President Schwab, of the United States Steel Corporation, will be a member of the board of directors, but the steel corporation as such has no connection with the new project. Julian Kennedy, of Pittsburg, assisted by Reid Kennedy, made the appraisements of the plants.

We have been advised that the furnace of the Woodstock Iron Co., Anniston, Ala., is to be practically rebuilt and enlarged in size. A new Kennedy top filler arrangement will also be placed on the furnace.

THE VOLLKOMMER PNEUMATIC CONVEYOR AND RUN-OUT FOR BAND AND SKELP IRON.

At the works of the Union Iron & Steel Co., Youngstown, O., before they were acquired by the American Steel Hoop Co., much trouble was found when rolling long pieces, in getting the pieces away from the mills rapidly enough and in keeping them straight. The pulling out of the pieces by boys limited the lengths of the band and the speed of the mills, thus limiting the production, and on hot days the boys refused to work. The roller conveyor of which several of differing types were tried, while better than pulling by hand, necessitated frequent repairs and stoppages, worked too slow, and were unfit for long bands. These troubles were overcome by pneumatic conveyors, which were a success

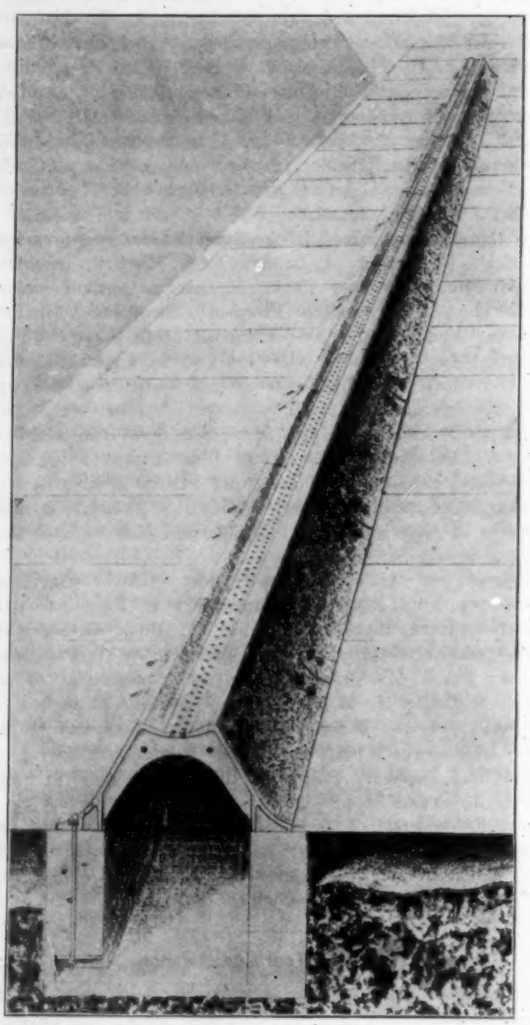


FIG. 1.—VOLLKOMMER PNEUMATIC CONVEYOR AND RUN-OUT.

from the start. A pneumatic conveyor was installed, 375 feet long, at a cost of less than $5,000 against the competition of a roller conveyor estimated at $25,000. Immediately after, two entirely new roller conveyors which cost $32,000 together, were thrown out and replaced by the pneumatic conveyors. At present the American Steel Hoop Co. has eight such conveyors in use, and more are under construction.

The principle is simple. Air from a fan, at low pressure, is driven into a conduit or air box (Fig. 1), from which it escapes through the air-ports in the face of runnning plate, forming an air cushion on which the strips are carried without friction. Theoretically, for each eight inch of thickness of the strip, a pressure of 1 1-10 ounce is required. In practice, however, a small excess over this pressure is needed; the narrower the strips are, the higher the pressure. In most cases the running plate is laid at the level of the mill floor, instead of having it raised as shown in the cut, and it is possible to walk or drive over it during operation. It does not obstruct the mill from rolling other shapes, as rounds and squares which may be run out in the same groove without air pressure. Fig. 2 shows the shape of the running groove with fixed guides for band iron. Fig. 3 shows an arrangement with a slightly inclined running plate and only one guide, which is also used as pusher to propel the strip sideways to the cooling bed; thence it slides to the shear run, where it is floated again, to lighten the work of the shear iron. In this shape the conveyor is especially adapted for skelp mills and for heavier and varying material generally.

The American Steel Hoop Co. has acquired the sole right for narrow sizes, up to 8 inches, while T. J. Vollkommer, 503 Lewis Block, Pittsburg, controls the patent for wider

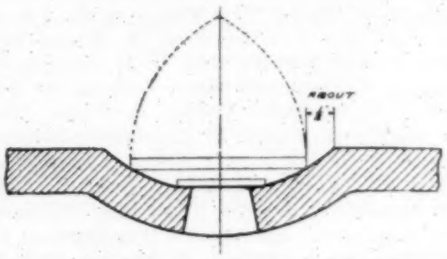


FIG. 2.—SHOWING SHAPE OF THE RUNMING GROOVE.

sizes. Some of the advantages of this method of handling flat material are these: The mill can be run at high speed; the pieces can follow each other without delay; the longest pieces can be rolled, thus saving crop ends and time; maintenance, repairs and first cost are considered economical; it does not obstruct the mill in rolling other material, nor the passage way; it cools the steel rapidly and uniformly, without injury to its temper; it ventilates the mill, especially during summer, if the air is taken from outside the building. Improved operation is secured on wide sizes over narrow bands from under which the air can escape freely. Mr. Vollkommer has applied the same principle to plate conveyors and shear tables, the resulting mechanism containing several new features of merit.

Obituary.

Henry S. Pickands, the senior member of the firm of Pickands, Brown & Co., Chicago, died at his home in that city Dec. 17. He was 68 years old, a native of Akron, O., and for some years a resident of Cleveland. He was a veteran of the Civil war with the rank of major. In 1873 he went to the Lake Superior region and assumed the management of the old Bay Furnace Co., manufacturing charcoal iron, and afterwards operated furnaces in Ohio and at Fruitport, Mich. The firm of Pickands, Brown & Co. was organized by him in 1855. Maj. Pickands had considerable interests in Lake Superior mining properties, particularly in the Minnesota and Chandler. He has been for years one of the foremost figures in the Chicago iron trade.

James Milholland, one of the pioneer engine builders of Pittsburg, and president of the J. & J. B. Milholland Co., died suddenly Dec. 16. He was born in Allegheny 64 years ago, and had been a continuous resident of the city. As a young man he founded the company of which he was president at the time of his death.

John D. Anderson died Dec. 14 at his home at Bellevue, near Pittsburg. He was born in Pittsburg in 1833, learned the machinist's trade and followed river engineering for several years. He subsequently was in the steel business of the Anderson Co. for some 20 years, in the mining department. In 1877 he prepared the steel from which the wire was made for the four big cables of the Brooklyn bridge. Mr. Anderson retired from business in 1888.

Charles S. Padgett, for many years manager of the Cumberland Nail & Iron Works, Bridgeton, Pa., died at his home at the latter place on Wednesday, Dec. 4.

J. Wendell Cole, Box 84, Columbus, O., and Box 486, Chicago, is sales agent for the Potter mesh separator, designed to prevent foaming in boilers and to secure dry steam, as described in our issue of December 5.

THE WESTERN MACHINERY MARKET.

CHICAGO, Dec. 16.—Manufacturers of all kinds of machinery continue to report a satisfactory condition of trade. New business is constantly coming to the front, and all plants are taxed to their utmost capacity in handling the business offered them.

The Standard Pneumatic Tool Co., Aurora, Ill., informs us that it has received an exceptionally large number of orders for "Little Giant" drills and hammers and other air appliances during the past month, particularly from the South and East, as well as from Germany and France. The company is enlarging its works and making a number of improvements to meet the ever increasing demand for its machines.

Whiting Foundry Equipment Co., Harvey, Ill., states that business is flourishing and that it has made several large shipments and received a great many orders during the month.

The Falk Co., Milwaukee, Wis., manufacturer of switches, frogs and crossings, motor gears and pinions, steel castings, etc., reports that business has been plentiful and is very sanguine as to trade prospects for the coming year.

Stephens, Adamson & Co., Aurora, Ill., engineers, founders and machinists, have sufficient work on hand to tax the capacity of their plant for several weeks to come, and report that the prospects are, they will run full time during all the winter months. The question of getting business has not been so great a problem with them as has been the matter of making deliveries. So full of work have they been all year, that it has been impossible to please all their customers in the completion and delivery of orders. Most of the contracts they have on hand are for grain elevator equipments, factory power plants, beet sugar plants, and malt house equipments. While the company do not expect to make any extensive additions to their factory in the immediate future, they state they will be obliged to add a number of new tools from time to time.

The Cutler-Hammer Co., Milwaukee, Wis., manufacturer of electric controlling devices, advises us that its orders during 1901 will foot up nearly 50 per cent in excess of those received in 1900. The business has shown a steady and healthy growth during the year, which reflects in a measure the general condition of the motor industry in this country. The company is satisfied with the outlook and believes from present conditions that the sales in 1902 will far exceed those in the year about to close.

Chicago Pneumatic Tool Co., Chicago, reports a constantly increasing demand for pneumatic appliances and that it has a large number of unfilled orders on hand. The foreign demand continues to improve, the company having received a large number of orders during the current month, and the outlook for domestic trade is very good.

The Kempsmith Mfg. Co., Milwaukee, Wis., manufacturer of milling machines, states that the demand for Kempsmith millers has enabled it to make unusually heavy shipments during the month of November. In fact, this month has been the best since the early part of 1900. Inquiries continue in a very satisfactory volume, but the company believes that the actual placing of shipping dates for many December orders will be after the turn of the year. From knowledge gained by personal visits, representatives of the company believe that the present activity will continue for several years.

Rock River Machine Co., Janesville, Wis., finds that the demand for Badger punches and shears increases right along and that it is unable to catch up with orders for the same.

Norton Emery Wheel Co., 25 South Canal street, Chicago, informs us that business is the "very best" for this season of the year, and that the general conditions have never been more promising than they are at present.

The Browning Mfg. Co., Milwaukee, Wis., manufacturer of motors and dynamos, reports that orders are coming in faster than they can be filled, deliveries on some extending considerably into the future. There is a marked increase in the application of motors to direct connection in machine shops, as evidenced by their mail.

Marinette Iron Works Mfg. Co., Marinette, Wis., manufacturer of mining machinery and Walrath gas engines, states that its plant is well crowded with orders for gas engines of various sizes, from 4 to 125-horsepower, most of which are for the larger size engines. Some recent orders from Pittsburg are as follows: Pittsburg Valve Foundry &

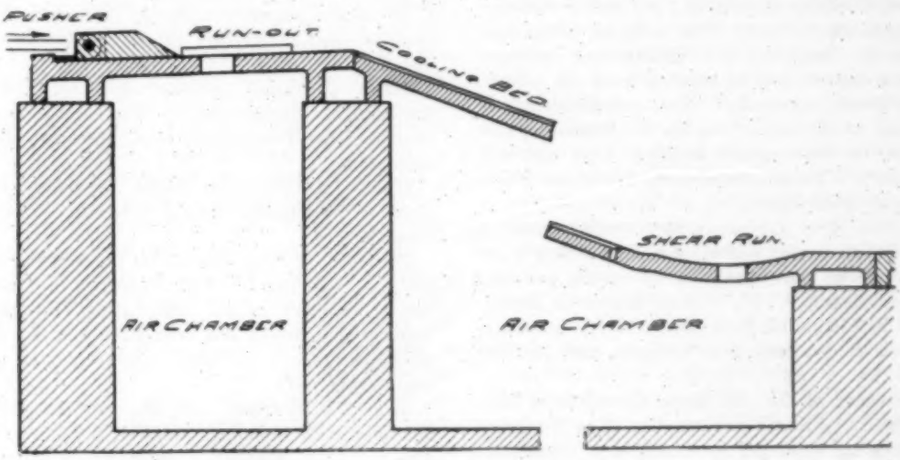


FIG. 3.—INCLINED RUNNING PLATE, WITH SINGLE GUIDE USED AS PUSHER. AIR CHAMBER UNDER BOTH RUN-OUT AND SHEAR RUN

Construction Co., 4 two-cylinder 80-h. p., and 1 three-cylin-cylinder 100-h. p.; Pittsburg *Commercial-Gazette*, 2 three-h. p; Pittsburg *Press*, 1 three-cylinder 75-h. p. and 1 three-cyinder 100-h. p.; Pittsburg *Commercial-Gazette*, 2 three-cylinder 125-h. p.; Hotel Henry, 3 three-cylinder 125-h. p; Carnegie Library, 2 two-cylinder 30-h. p., and others ranging from 30 to 100-h. p., most of which are to be installed either direct-connected or belted to generators, furnishing power and light. The company is also putting in 2 three-cylinder 75-h. p. engines in the Republic Glass Co.'s plant at Clarksburg, W. Va., and has many orders ahead for private and municipal lighting and pumping plants. It recently enlarged its plant, installing new tools and machinery, electric traveling crane, etc., among which was one of R. D. Wood & Co.'s gas producer plants for furnishing power for the factory.

Pawling & Harnischfeger, Milwaukee, Wis., manufacturers of traveling cranes, report that every department of their works in crowded to the utmost capacity.

Perry Ransom, Oshkosh, Wis., manufacturer of Vulcan grinding and polishing machinery, has orders on hand for 12 No. 5 grinders for a Pennsylvania concern, 5 for a Milwaukee shop, and many smaller sized orders for other concerns. He has just completed and shipped what he believes is the largest disc grinder ever built in this country, which is 27 inches. Mr. Ransom reports he has enough business on hand to keep his plant busy for some time to come, and that there is a disposition on the part of buyers of machinery to buy for delivery quite a distance in the future.

THE NEW YORK MACHINERY MARKET.

NEW YORK, Dec. 16.—The local machinery trade is unusually buoyant for this season of the year. Naturally a falling off in the volume of business is expected, but the present month is holding closely to the standard set during the past 60 days. December is not the most attractive month of the year from the standpoint of the manufacturer of machinery, yet the numerous sales and inquiries indicate a healthy vigor that will tend to sustain prices and keep the shops busy. Prophecies are freely made in reference to the record breaking pace likely to be made during the coming year.

The recent death of John L. Howe, president and treasurer of the firm of Peter A. Frasse & Co., machinery and supplies, 94 Fulton street, New York, has caused some changes in the personnel of the executive force. C. H. C. Beakes has been selected as president; Adolph E. Brion, the former secretary, will be treasurer and general manager, and John Briggs will succeed Mr. Brion.

The H. W. Johns Mfg. Co. of New York, and the Manville Covering Co. of Milwaukee manufacture asbestos goods and are the largest concerns in their line of work. The two firms have been working in harmony for several years, and it has seemed an auspicious time for the consummation of a more formal union of the two interests. The new company has filed papers in the State of New York with a capital stock of $3,000,000, of which $500,000 is 7 per cent cumulative preferred, and $2,500,000 common. Practically all of the preferred stock has been underwritten. Officers and directors of the consolidated concern will be selected from the personnel of the constituent companies. The consolidated corporation which will be known as the H. W. Johns-Manville Co., will establish its headquarters in New York and will have branch offices at Chicago, Milwaukee, St. Louis, Philadelphia, Boston and other places.

A number of New York capitalists have recently made a trip to Mobile, Ala., to inspect a site for a shipbuilding plant at Alabama Port. The party traveled by special car and comprised Chas. M. Jessup, C. M. Wilkes, Robert C. Morris, R. M. Jessup, S. B. McConihe, New York; Henry Konitsky, Philadelphia; John S. Walters, New Orleans, and Jas. W. Jackson, Augusta, Ga.

The general manager of the De Beers Consolidated Diamond Mines, Kimberley, South Africa, is in New York for the purpose of placing contracts for machinery, equipment, etc. An order for a number of hammers has been given the New York representatives of the Chicago Pneumatic Tool Co. for shipment to Kimberley.

The P. H. & F. M. Roots Co., Connersville, Ind., has secured a contract from the Wall Street office of the South Porto Rico Sugar Co. The order is for pumping equipment to be utilized for irrigating purposes on the Guanica plantation in the southern part of Porto Rico. The pumps will be of the rotary type direct-connected to General Electric Co.'s motors, and the machinery will entail an expenditure of some $100,000.

Thayer & Co., Inc., Cortlandt street, have had some of the contracts for the extension of the Nagasaki Electric Light Co. of Nagasaki, Japan. One of these calls for a 300-h. p. boiler equipment, which will be furnished by the Aultman & Taylor Mfg. Co. of Mansfield, O.

H. O. Swoboda, of New York, together with J. T. Beswick and Davis Beswick, of Brooklyn, have formed the Electric Motor Specialty Co. with a capital of $20,000. A charter has been obtained at Albany.

The Japanese Government has invited an estimate on the construction of 30 locomotives. The American Locomotive Co. has the matter under consideration.

Frederick G. Bourne, William F. Proctor, Douglas Alexander and Theodore E. Hardenburg, of New York, and Oscar F. Graham, of Elizabeth, have incorporated the Bourne Co. at Albany. It will have a capital of $100,000 and will buy, sell and manufacture sewing machines. The agent is L. B. Miller, general superintendent of the Singer Mfg. Co. at Elizabeth.

The Automatic Coaling & Weighing Barge Co. of Brooklyn has filed articles of incorporation with the Secretary of State at Dover, Del. The incorporators are John S. Nuggett, Francis H. Wilson, P. B. Clarke, of Brooklyn, and James Virden, of Dover, Del. The capital stock is $500,000.

The Toluca Electric Co. Toluca, Mex., has awarded a contract to the local office of the Pelton Water Wheel Co. for 120 tons of pipe and three 700-h. p. wheels. The Pelton people have also secured an order for a 300-h. p. plant and other equipment for another hydraulic installation in Mexico.

The Coil Clutch Co., 45 Broadway, is introducing a form of clutch which has found favor abroad and will be described in *The Iron Trade Review*. The president of the company, Mr. Ihling, has the device in the hands of some of the largest rolling mill users in the country.

PERSONAL.

E. L. McGary, late chief engineer of the American Steel Hoop Co., has opened offices in the Kleber Bldg., 223 Fifth Ave., Pittsburg, as consulting engineer. Engineer McGary will design and install complete rolling mill plants, hoop and cotton tie mills, structural, bar and guide mills, sheet and tin plate mills, continuous mills, skelp mills, cold rolling mills, blooming, plate and universal mills and steam, hydraulic and electric plants. As chief engineer of the American Steel Hoop Co. Mr. McGary was well and favorably known.

At a recent meeting of the directors of the Pittsburg Coal Co., of Pittsburg, Pa., Frank M. Osborne, president, and C. W. Baine, secretary, tendered their resignations to become effective Jan. 1. Reports of friction among the officials are denied.

Frank Townsend, recently connected with the Republic Rubber Co., Youngstown, O., has been appointed chief electrician of the Youngstown Iron, Sheet & Tube Co., Youngstown, O.

James J. O'Donovan, master mechanic at the Bessemer plant of the Republic Iron & Steel Co., Youngstown, O., has resigned.

Theodore J. Vollkommer, M. E., formerly connected with the American Steel Hoop Co., has opened an office as consulting engineer in the Lewis Bldg., Pittsburg. Mr. Vollkommer will design and erect hoop and bar mills, pneumatic skelp, bar, sheet and plate conveyors and will do general engineering work.

Richard B. Sherman, who for more than 20 years has been identified with Manning, Maxwell & Moore, New York, and who has been manager of their supply department has severed his connection with that company. Mr. Sherman has not definitely decided in what business he will engage.

Preston B. Large, manager of the plant of the Buffalo Steel Co., Towawanda, N. Y., was severely burned while in the mill last week.

T. J. Costello, superintendent of the two tin plate plants of the N. & G. Taylor Co., Cumberland, Md., has also been appointed superintendent of the plant of the Maryland Sheet & Steel Co., at the same place in which the N. & G. Taylor Co. is interested.

George V. Sims, representing Joseph Bedford, a steel manufacturer of Sheffield, Eng., arrived in Pittsburg last week for the purpose of demonstrating to the officials of the Crucible Steel Co. of America the Bedford process of making crucible steel.

William H. Lewis, superintendent of the steel plant of the Sharon Steel Co., South Sharon, Pa., was given a reception by his former employes in the steel plant of the National Steel Co., New Castle, Pa., last week.

Lemuel Bannister, for the past five years general manager of the British Westinghouse Co., with headquarters in London, Eng., has resigned all his positions with the Westinghouse interests. Mr. Bannister has not been in the best health for several years and he will remove to Germany with his family.

William B. Leeds, of the American Tin Plate Co., has been elected president of the Chicago, Rock Island and Pacific railroad.

A. T. Shoemaker, who was for a number of years sales agent for the Illinois Steel Co., at New York, is now associated with the sales department of the Runskool Metal Co., 13 Cedar St., New York.

PRESENT DEMAND FOR IRON AND THE OUTLOOK.

Archer Brown, of New York, has given an interesting interview to the New York *Commercial Bulletin* on the sources of the present heavy demand for iron and steel products and the prospects for its continuance. He says:

"To get a proper view of the current iron trade it is necessary to go to the bottom facts of the business situation. A very natural view is that so heavy and widespread a demand, which taxes every furnace and rolling mill in the country to its utmost capacity, must be due to special causes, which will disappear sooner or later and leave producers without a market. It is only two years since this very thing happened. The recollection of a drop of $6 to $10 a ton in pig iron and steel billets and $20 per ton in some finished forms of steel is still fresh in the minds of the trade. We are often asked the question by those outside of the business why the same thing may not happen again and perhaps before we know it.

"The answer lies in the conditions which are at the bottom. The boom of 1899 was partly real and partly speculative. Legitimate demand increased rapidly and overtook the capacity of furnaces. Then followed a scramble for materials which sent prices up with a rush. In this upward movement speculation cut a large figure. Dealers and even private speculators bought iron and held it for a rise. But a still greater factor was the overbuying of manufacturers, who feared lest they might be squeezed in the famine, or who expected to make a profit in the rise of raw materials. When the drop came it was found that the trade generally had overbought 10 to 40 per cent. Efforts to cancel these more or less fictitious orders carried the decline much farther than it should have gone. It led to a year or more of very low prices when the real situation warranted higher prices.

"The present activity is wholly free from the element of speculation. Instead of consumers overbuying they have been for months underbying, in the belief that the productive capacity was becoming so great that prices would soon react. So stocks were allowed to roll up at furnaces when they should have been in consumers' yards. Now the clamor for material actually needed in manufacturing is something unprecedented. Of course it is aggravated by the congestion in railroad traffic. If there has been any speculation on the part of dealers or other interests such as we witnessed two years ago it has escaped the attention of those in the trade. The real fact is that the trade sentiment has been far from bullish, and even the best informed have not been able to grasp the meaning of the steady growth in the country's demands for iron and steel.

"We can now see pretty clearly what the country is going to call for next year. The lowest estimate of the requirements for rails is 2,700,000 tons; for cars, 2,000,000 tons. For locomotives an intelligent estimate places the needs at 1,500,000 tons, and for railroad bridges the same. We therefore face a total need of the railroads of, say, 7,500,000 tons for track and equipment. This is half as much as the whole country produced last year. As a matter of fact, orders are already placed for the great bulk of this business.

"Then we come to such large consuming lines as electric railroads, cast iron pipe, structural steel, plates for shipbuilding and the miscellaneous needs of over 4,000 foundries and machine shops through the United States. The aggregate of these under normal conditions is nearly double that of the railroads. We are now producing approximately 17,000,000 tons per annum, which describes the maximum capacity of the country in pig iron, the basis of the whole steel and iron industry. That there will be further development of plant if present demand continues goes without saying, but it takes a year and a half to build a blast furnace and two to three years to build a large steel works."

In regard to how much of current increased demand can be considered as likely to prove permanent Mr. Brown said:

"The answer lies in the future growth of the country. If cities continue to build or enlarge water and gas works, electric lines, high buildings, etc., and if railroads continue the process of reconstruction on modern lines nothing can prevent a steady increase in legitimate demand for iron and steel. A factor that is not generally appreciated is the doubling of the scale of construction in nearly everything that is built. A railroad car, a locomotive, a bridge, an electric car or electric railway track is now something more than three times as large as it was fifteen years ago and calls for proportionately more material. This process of reconstruction will go on for many years because the greater part of the industrial and railroad plant of the country is still too light for modern needs and must of necessity be replaced. When financial and business conditions are as good as at present there seems to be no limit to the amount of construction work in sight. When bad financial or business conditions arise projects of course are held in abeyance and demand for iron slackens. Men of a skeptical turn have been looking for some weak spot in the present situation to suggest a backset in business, but they do not seem to find it. That it will come in time no one doubts, but it can safely be said that it is not in sight.

"As to entirely new uses of iron they are many. A few that are readily recalled are displacement of wood in shipbuilding and car building, in agricultural implements, telegraph and telephone poles and the like. The multitude of small uses, which cannot be named, reach in the aggregate a large tonnage. There are 4,000 jobbing foundries in the country, nearly every one of which has some specialty which it is pushing.

"The steadying influence of the United States Steel Corporation has now become an important factor in the business. It has been tried long enough to prove its efficiency. It can safely be said that but for the conservative policy of that big organization we should now have a runaway market. Their grasp of the situation is well nigh complete, controlling as they do the old range Lake Superior ores, the largest coke plants and the most extensive and modern finishing plants in the various lines of steel production. It is too early yet to predict the operation of this great power in slow and declining markets, but there is every reason to believe we have seen the end of the extreme fluctuations in iron values for many years to come."

Referring to the production of pig iron in the United States and other countries Mr. Brown says: "There has been a marked change in the iron situation in the last twelve months. The world's production of pig iron in 1900 was a little short of 40,000,000 tons, of which the United States supplied about 14,000,000 tons, or considerably over one-third. But the current year has witnessed great changes on both sides of the Atlantic. There has been a great increase in the output in the United States and at the same time a sharp curtailment in the European countries. The year 1901 closes with this country producing in excess of 17,000,000 tons a year. Germany and Great Britain have each dropped over 1,000,000 tons.

"When the figures for the year are made up it will likely be found that the world's production outside of America will not exceed 22,000,000 tons, and we shall start the new year making at the rate of about 17,500,000 tons. Those who take a broad view of this nation in commerce and industry are not afraid to predict that history will repeat itself in the next decade, and that in 1910 the United States will double its output of iron in 1900 (13,789,000 tons)."

New Control of Dominion Iron & Steel Co.

A Boston dispatch says that President Henry M. Whitney has disposed of his controlling interest in the Dominion Iron & Steel Co., of Sydney, Cape Breton, to James Ross of Montreal and other capitalists in the Bank of Montreal. Although Mr. Whitney is president Mr. Ross has practically had the management of the company for some time and this sale of stock gives him control. It is not understood, however, that Mr. Whitney has sold his entire interest, and he may remain a director, although it is expected that he will retire from the presidency at the next election. Mr. Ross will assume the executive direction of the company's works at Sydney at once.

Mr. Ross, it will be remembered, accompanied General Manager Moxham recently on a visit to Central Western steel works.

The Standard Pneumatic Tool Co. will erect a $20,000 addition to its Aurora, Ill., plant.

USES OF ELECTRICITY AT BERLIN.

Consul-General Frank H. Mason, of Berlin, who has represented the United States at various points in Germany in the last 20 years, is probably the most reliable writer on industrial topics in the entire consular service. Special interest attaches therefore to his communication. In a recent report to the State Department on "The Uses of Electricity at Berlin," he says:

"Notwithstanding the stagnation and depression which now overshadow industrial development in Germany, the application of electricity to the various purposes of power and illumination in Berlin has gone on apparently unchecked. The horse cars, of which there were many hundreds in service in the capital and its outlying suburbs a year ago, have all but disappeared from the streets, except where they are used as trailers behind the electric cars to accommodate the rush of travel during the morning and early evening hours. Everywhere in streets and public places and in hundreds of new buildings, electric lights are supplanting gas and other means of illumination.

"From a report of the Berlin Electrical Works, just published, it appears that there are supplied from its generators 353,253 arc and 14,274 incandescent lamps, besides 6,426 electric motors of 21,448 aggregate horsepower, and that of this vast array 49,949 arc lights, 1,878 incandescent lamps, and 1,462 motors were newly installed within the circuit of that one company during the year which ended on the 1st of October. This increase of 21 per cent in the consumption of current of course does not take into account the numerous large new buildings, factories, and other establishments which have independent lighting and power plants under private ownership and control.

"Especially has the development of electrical tramway lines been on a phenomenal scale. One year ago, the aggregate electrical energy consumed for this purpose was 8,000 horsepower; it is now 16,800-horsepower, having more than doubled in a single twelve-month. When the principal city lines were changed from horse to electric equipment, the municipality held out firmly against the use of overhead conductors in the central districts. The trolley was tabooed on all except suburban routes, so that cars intended for use on lines running from the central portions of Berlin to outlying districts were equipped for both methods of transmission—trolleys for suburban sections and heavy storage batteries to carry them over the down-town portion of their route. This made the cars heavy and costly, but they worked fairly well until a 6-inch snow fall exhausted the already overtaxed current supply, and filled the busy down-town streets with 'dead' cars that had to be hauled out by horse power. From that time the overhead wires crept farther and farther into the city, until they now substantially supply most of the lines throughout their entire length. This vastly improved service—especially the greatly accelerated speed on the suburban lines—has practically revolutionized the conditions of public transportation in Berlin, and has drawn a constantly increasing percentage of population to Halensee, Charlottenburg, Friedenau, Wilmersdorf, and a dozen more populous and handsomely built towns which have sprung up in recent years within a radius of seven or eight miles from the cathedral of Berlin.

"Of the entire consumption of current, 21 per cent is used for lighting, 22 per cent for miscellaneous power purposes, while the remaining 57 per cent are charged to the tramway lines. The average price to consumers in Berlin is 18.9 pfennings (4.5 cents) per kilowatt hour, and the total current supplied by the company increased from 62,349,846 kilowatt hours in 1900 to 89,668,258 in the fiscal year 1901.

High Speed Trolley Car Experiments.

"It is from one of the power stations of the Berlin Electrical Co. that the current supply is transmitted at high voltage from Oberschönweide, on the River Spree above Berlin, across to Marienfelde for the high-speed electrical railway experiments, a preparatory account of which has been given in preceding reports of this series. After many months of careful preparation, the actual tests began at the end of September on the stretch of standard-gauge track between Marienfelde and Zossen. They have been from the first carefully guarded from public observation, and no technical account of the difficulties encountered and results attained will be accessible until the full official report of the engineers in charge of the experiments shall be published.

"From entirely trustworthy sources, however, information has been obtained, from time to time, on the basis of which it can be stated that during the first few days the speed attained did not exceed 90 kilometers (55.9 miles) per hour. This was gradually increased until the record of yesterday (Nov. 9) shows a pace of 150 kilometers (93.2 miles) per hour, which according to the best information that can be obtained, is considered the practicable limit of advisable speed with the equipment thus far devised. Above that velocity the increasing danger of derailment and the tremendous strain upon track and rolling stock would, it is believed, outweigh the advantages of higher speed with the machinery now available. It is therefore understood that the experiments are suspended, at least until some radical changes, suggested by this experience, may be made in the construction of motors and other details of the apparatus.

"The official report, when it shall appear, will be replete with new and interesting data for electrical scientists. The motors, although in at least one instance 'burnt out' by the powerful current, have apparently done all that was expected of them, and the expected difficulty of 'getting the current into the car' from a triple overhead wire seems to have been successfully overcome. The other anticipated obstacle—air resistance—proved less serious than was expected. Th maximum pressure registered by the instruments placed in front of the cars was 134 kilograms per square meter—approximately, 16.7 pounds per square foot.

"The present results of the experiments, although falling far short of the extreme rates of speed which were somewhat glibly talked about as likely to be attained, demonstrate anew the difficulties and consequent greatly increased expenses which inevitably attach to extreme velocities, but they will form a new and valuable groundwork of demonstrated facts upon which further experiments toward still higher rates of speed can safely be based."

Smelter managers are coming to recognize the value of the White briquetting press for putting fine ores, flue dust, concentrates and slimes into solid block form, and the demand for these machines is increasing both in the United States and abroad. In the month of December, the Henry S. Mould Co. of Pittsburg, has shipped White briquetting presses to the following firms: Allis-Chalmers Co. for the Backus & Johnson Co. of Lima, Peru; the Kendrick & Gelder Smelting Co. of Silverton, Colo.; the Granby Consolidated Smelting, Mining & Power Co. of Grand Forks, B. C.; the United States Mining Co. of Salt Lake City; and a second outfit to the Bingham Copper & Gold Mining Co. of Salt Lake City. These machines have come into general use in Australia and Tasmania, and already the Pittsburg manufacturers have established briquetting plants at a number of smelters, among them being the Broken Hill Proprietary Co., Port Pirie, South Australia; the Mount Lyell Mining & Railroad Co. at Mt. Lyell, Tasmania; the Tasmania Smelting Co. at Zeehan, Tasmania, and the Smelting Co. of Australia, Ltd., at Dapto, Lake Illawarra. The Australian agents of the Henry S. Mould Company are Knox, Schlapp & Co., 163-169 William St., Melbourne. The home office of the company is in the Empire Bldg., Pittsburg.

The W. B. Pollock Co., Youngstown, O., has been awarded the contract for the erection of four steel cars, after patents of E. W. Summers. These cars will be tested for a period of six months and if found to come up to the claims of their inventor a company will be organized at Youngstown for their manufacture.

It is altogether probable that the plant of the Crawfordsville Wire & Nail Co., Crawfordsville, Ind., will be rebuilt. The stockholders have been requested to subscribe up to the full limit of their stock allotments and in this way fully $50,000 can be raised for rebuilding the plant.

TRADE PUBLICATIONS.

The cloth-bound volume recently issued by R. D. Wood & Co. of Philadelphia, is far removed from the ordinary trade catalogue and will have a better chance of preservation than less useful material. The firm has prepared a number of pamphlets on water and gas works apparatus and these have been so steadily in demand that in the present enlarged and revised edition an outline is given of various systems of water supply and kind of illuminating gas, with the appliances, more especially those made by R. D. Wood & Co., that are used in this work. The book does not profess to be a treatise but it is intended to answer some of the questions asked by persons contemplating the building of new water and gas works. The volume contains 175 pages, 10½x8¼ inches, and in addition to the apparatus described in the edition of 1896 some attention is given to the more recent extension of the business to the manufacture of steam pumping engines and centrifugal pumps. The lines of producer gas apparatus and hydraulic tools and machinery have lately grown to the extent that they require separate pamphlets.

The Star Dynamo Works, Jefferson City, Mo., has a new catalogue of direct current, bi-polar and multi-polar, dynamos and motors. It is standard size, 6x9, with a general description of the apparatus. The frame is a single casting with projections on either side to receive the bearing supports, these projections being faced during the operation of boring out the pole pieces ensuring an accurate alignment. The commutator capacity is calculated at the rate of fifteen amperes to the square inch of carbon brush section.

The new catalogue of the Cincinnati Planer Co., Cincinnati, consists of 32 pages, 6x9, showing the standard line of planers from 24 to 60 inches. The company has recognized the existence of a large variety of work where height is proportionately not so essential and a widened planer would be more efficient than a standard machine. A 42-inch standard machine is widened out to 60 inches, for example, and is stiffened to correspond with the greater range. The catalogue contains illustrations of motor driven planers, the motors being placed on the housing with a heavy driving pulley so that there is no immediate increase in the consumption of current at the instant when the planer is reversed.

The Grant Tool Co. of Franklin, Pa., has a beautifully illustrated catalogue of the tools that the firm have on hand or under construction. These comprise hand lathes, screw-cutting engine lathes, turret machinery, semi-radial drill and boring mills, floor-boring machines, millers, hobbing machinery, forge lathes, etc. In addition to these the company has several large tools in process of design and construction which will be illustrated later.

A copy of the "Brownhoist" pamphlet, descriptive of locomotive coaling stations, has been received from the Brown Hoisting Machinery Co. of Cleveland. The book describes new methods of coaling locomotives, and shows pictures of a plant designed and built by the Brown Hoisting Ma- new methods of coaling locomotives, and shows pictures of a plant designed and built by the Brown Hoisting Machinery Co. and now in operation. Coaling locomotives is a subject of great importance to all those connected with transportation work, and the novelty of the design embodied in the "Brownhoist" system, not to speak of the economy of operation and compactness of equipment, presents many features of marked improvement over old methods, an advancement which makes the appearance of this book of more than ordinary interest.

The Milwaukee-Rice Machinery Co., Milwaukee, Wis., now has in press a new catalogue of machinists' supplies, tools and machinery, containing over 500 pages, to be known as "The Machinist Supply Book of the Northwest." It is devoted entirely to the interests of manufacturers, mills, mines and railroads in their machine shop and general equipment maintenance. The company manufactures power transmission appliances, pulleys, shafting, hangers and belting. The catalogue is to be ready for distribution about Jan. 1, 1902.

The paper read by Alexander J. Wurts, manager of the Nernst Lamp Co. of Pittsburg, at the 18th annual convention of the American Institute of Electrical Engineers at Buffalo, Aug. 23, 1901, has been reprinted from the transactions of that society for general circulation. The pamphlet contains the history of the development of the Nernst lamp in the United States and gives a technical and exceedingly interesting account of the construction and efficiency of the device in detail. Illustrations, half-tones and diagrams, are freely introduced and the publication as a whole will be found a notable chapter in the story of electrical illumination.

The 42d catalogue of the Flint & Walling Mfg. Co., Kendallville, Ind., is a portly and prosperous appearing volume of 248 pages, covering pumps and pumping engines, windmills, pipe fittings, vises, wrenches, etc. These are described in great variety and the book is profusely illustrated with attractive half-tones.

The C. H. Dutton Co., Kalamazoo, Mich., has issued the 15th annual catalogue of engines and boilers. The engines are built horizontal or vertical, center or side-crank, Rites governor or throttling, according to the special service required. The firm has incorporated in the catalogue a list of the component parts of each engine with a price list, a telegraphic code and a table of the measurements for setting stationary boilers.

Unprecedented Scale of Railroad Orders.

The Pennsylvania Co. will spend over $6,000,000 for locomotives next year and nearly $1,000,000 for passenger cars. The company's total expenditures for rolling stock and motive power for 1902 as far as decided upon are as follows: Freight cars, $20,000,000; locomotives, $6,000,000; passenger cars, $1,000,000; total, $27,000,000. It is believed that the amount will finally reach $30,000,000. The following general statement is made as to the locomotive program for 1902:

For the lines East orders have been placed with the Baldwin Works for 195 freight locomotives. In addition to these the company intends to build about 100 other locomotives at its own shops, which are likely to be divided about evenly between freight and passenger, making a total of about 300 for the lines East. For the lines West about 100 locomotives have been ordered, 50 freight from the Baldwin Works, 15 freight to be built at the Richmond Works of the American Locomotive Co. and probably 35 at the Juniata shops of the Pennsylvania. The company has authorized the building of 4,000 freight cars besides those recorded four weeks ago, and 3,225 of the new lot have been ordered as follows: 1,500 steel underframe gondolas, and 225 box cars from Pressed Steel Car; also 1,500 steel underframe gondolas from American Car & Foundry; 775 box cars with steel underframes; 775 gondolas and 500 box cars from the Pullman Co.

The Philadelphia *Ledger* says: "No less than nine big bridges spanning five large rivers and costing at the lowest estimate $12,000,000 are now in various stages of construction or are planned for early erection on the Pennsylvania lines east of Pittsburg."

The American Car & Foundry Co., according to the *Railroad Gazette*, has received new orders for cars as follows: Seaboard Air Line 300, Reading 1,150, Buffalo, Rochester & Pittsburg 500, American Refrigerator Transit Co. 200, Colorado & Southern 400, Rock Island 300, Pennsylvania 1,500, Lackawanna 2,000, and miscellaneous 251, making a total of 6,601 cars. The Colorado & Southern has ordered 15 locomotives from the American Locomotive Co. The Burlington has ordered 50 locomotives from the Baldwin Works and the Chicago & Northwestern is having 15 locomotives built by the Rhode Island Works.

Samuel R. Callaway, president of the American Locomotive Co., says of the locomotive business: "The prospect, as well as the present state, is very gratifying. Already we have orders on hand that will keep us as busy as we can be all next year. What will come after that, of course, is for time to disclose. But the condition of the locomotive business, as reflecting the railroad business of the country, indicates that the present high state of prosperity is to continue next year, at least. Our orders are nearly all from home, some few from abroad, but the domestic demand is such that we have all we can do to meet it."

The Citizens' Water Co., of Washington, Pa., is in the market for a 150-h. p. boiler.

SOME PECULIARITIES OF SPRINGS.

At the recent meeting of the American Society of Mechanical Engineers at New York, Stephen W. Baldwin presented a brief paper on a "Spring Testing Machine," and some peculiarities of steel springs shown by its use. It was as follows:

"When a coiled spring is put under a car or similar vehicle, the character of the loading, or impact, on the spring is often such that the load is suddenly applied, and then suddenly released. The tendency of the spring is to cause the body of the vehicle to 'teeter,' until the effect of the applied load successively compressing the spring and allowing it to release itself is diminished by the disappearing of the vibrations. The flat, or leaf spring, as applied under carriages, locomotives, and elsewhere, by reason of the friction of the leaves upon each other, does not produce this same teetering effect, and for this reason is a preferable type. The room which the flat, or leaf spring occupies, and its greater weight and cost, are the objections to its use. It would obviously, therefore, be an advantage if a coil spring could receive from without some effect similar to the friction of the leaves on each other, whereby an impedence of its tendency to 'diddle' could be caused, and its vibration could be either removed or diminished.

"It has recently been observed by a firm of spring makers that a testing machine for springs could be devised whereby the application of the load upon a lever, which was counterbalanced by the spring, would cause that lever to trace the ordinates of a curve, the paper being moved transversely at right angles to these ordinates while the lever was vibrating. It would appear from the character of the diagram [submitted with the paper and made by a coiled spring of the ordinary sort] and the method whereby its lines were drawn, that the curve through the extremities of these ordinates should be of a hyperbolic form. The height of the ordinates appears to vary inversely as the abscissas which are proportionate to the times. The mathematical analysis which brings out this result is aside from the present purpose, but it will be apparent that the stiffer the spring the less will be the amplitudes of the vibrations, and that the greater the deformations the longer it will be before the spring comes to rest. It would appear, therefore, that as a spring lost its life, in the technical sense of that word, the form of the diagram would alter.

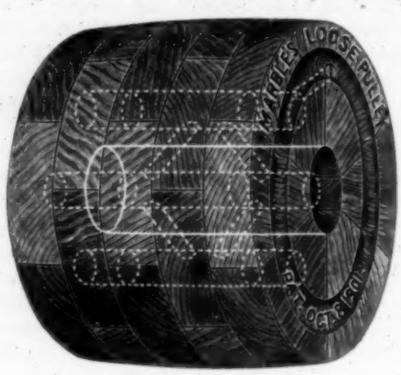
"Two practical questions are therefore suggested by this method of testing and the diagrams which it presents. The first is: Can the adapatability of a steel for spring purposes, either as the result of its chemical constitution or its heat treatment, be inferred from the form of the diagram which it would give when tested by this method, and by the making of such a record? Second: Would the modification of the diagram caused by fatiguing a spring by test in the ordinary type of impact machine give a further and satisfactory indication as to the wisdom and adaptability of a certain manufacturing process or quality for springs? It is believed that the scientific question, resting so closely upon a practical basis, which is involved in the foregoing discussion, should bring out interesting results.

"The diagram from a flat, or leaf spring illustrates the conditions where applied friction impedes the tendency to vibrate. Not only is the number of vibrations much less, but the time covered and the space passed over by them are noticeably less."

The author of the paper said in the discussion on it that he had seen a machine designed for testing coil springs, which introduced a frictional resistance or damping effect, and this had suggested the points brought out in the paper. A. Cary followed, submitting the result of his experience when actively engaged in the manufacture of springs. He pointed out the injurious effect upon the action of the spring when the ends of a coil under compression are not squarely supported, when the load does not act along the axis but is applied eccentrically, etc. He illustrated his discussion by a number of sketches drawn on the blackboard, showing devices for reducing the range of vibration in coil springs, secondary springs to receive the load after the primary coil had been compressed a certain distance, layers of rubber inserted between the convolutions, dash pots (as in door checks and governors), etc. His experience had led to the conclusion that coil springs are highly reliable and durable when properly made. On the other hand he had found leaf springs very troublesome on the score of the friction, causing them to wear out much sooner than the other type. Mr. Cary had not been engaged in the manufacture of springs for some time, and had not preserved any complete data of experiments made during that period. He was convinced, however, that the differences in temper had no influence on the modulus of elasticity, and believed that a steel of higher temper had merely a higher elastic limit and the oscillations of the spring would therefore not be affected.

A NEW LOOSE PULLEY.

Loose pulleys are the bane of the shop management and are classed as necessary evils. The accompanying engraving shows the construction of a new solution of the loose pulley problem. It is a built-up pulley, each layer being composed of six segments cut out of hard wood, so that the end of the grain comes toward the center. As many of these built-up segmental plates are put together as is necessary to make the required width of face. The inner layers—that is, all those except the ends of the pulleys—are bored with small holes parallel to the main hole through which the shaft passes. Each of these holes is connected to those adjacent and from the outside of the pulley at one end another hole leads into one of these chambers, this system forming the lubricating arrangement. In a medium-sized pulley a pint of oil



NEW LOOSE PULLEY.

is necessary to fill it. An oil-proof coating covers the surface of these holes toward the outside of the pulley, and the oil finds its way by capillary attraction with the grain of the wood to the shaft. After becoming once thoroughly impregnated with oil one charge will last it for six months or more, so that it is practically self-oiling.

It is claimed that the pulley is more durable than an iron pulley. They are regularly made from 4 to 24 inches in diameter, and from 2-inch to 24-inch face, but any size desired can be furnished. This pulley is being manufactured by the Marble-Swift Mfg. Co. of Buchanan, Mich., the main office being in the Monadnock Building, Chicago.

The Ironsides Co. of Columbus, O., manufacturers of wire rope, shields and fillers, gear pipe and belt shields, paints and engine oils, etc., is sending a souvenir match box, of very neat and attractive construction, to the trade. The match box is of metal covered with celluloid and bears a fine illustration in colors of the Constitution—"Old Ironsides"—and on the other sides of the case are illustrated and described several of the leading specialties of the company.

The British Steamer Drummond, which arrived with a cargo of ore at Philadelphia, Pa., last week is the 100th vessel to arrive with an ore cargo this year at this port. She had on board 4,000 tons. The total ore landed at Philadelphia this year from foreign ports amounts to 382,764 tons.

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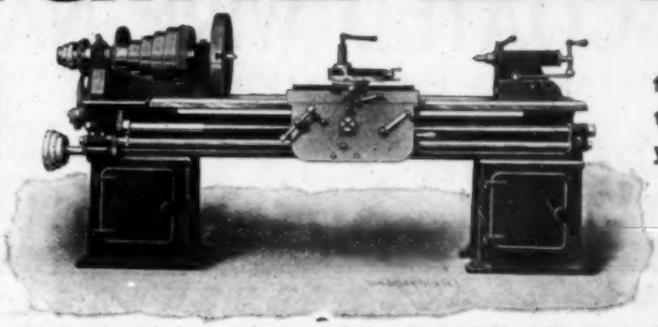

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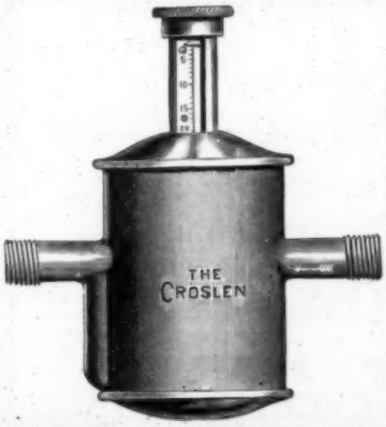

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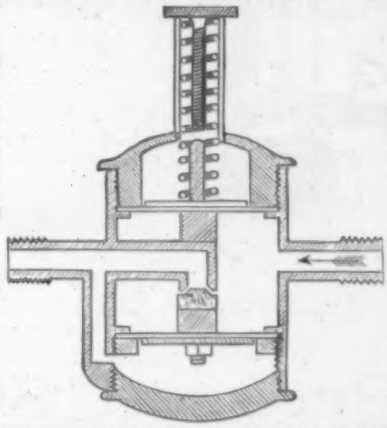

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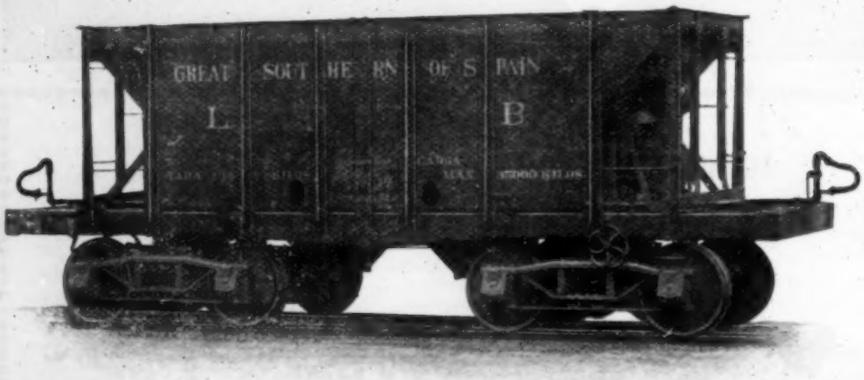

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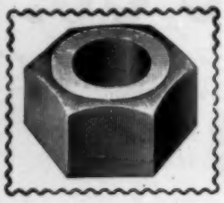

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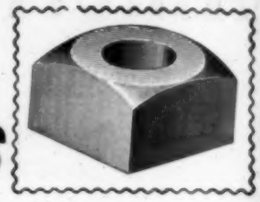

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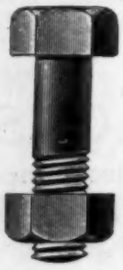

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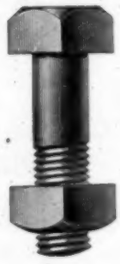

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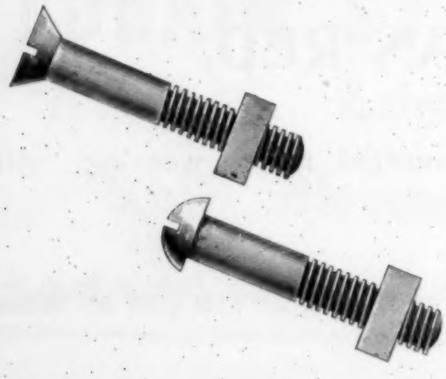

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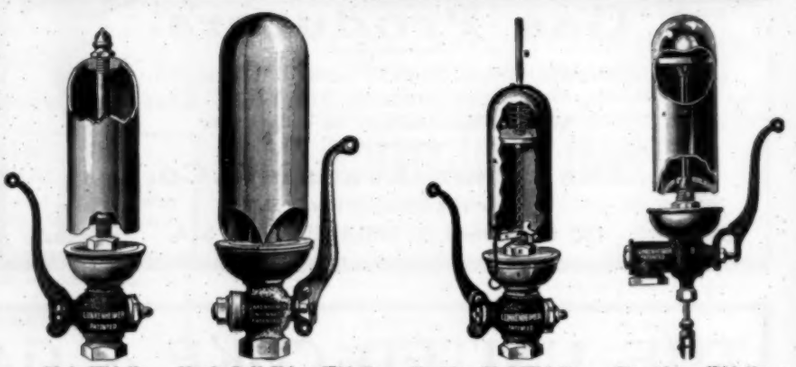

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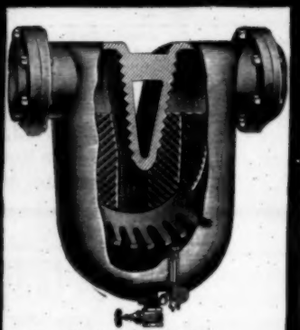

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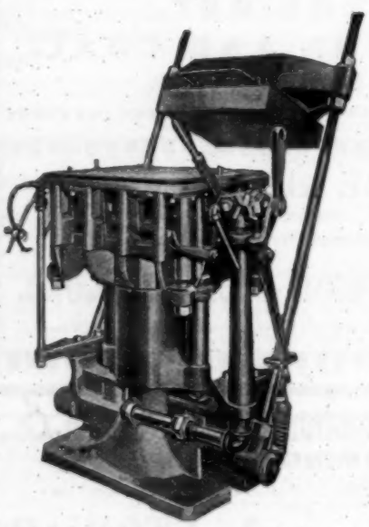

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